TM 11-5820-785-12

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR'S AND ORGANIZATIONAL MAINTENANCE MANUAL

RADIO SETS
AN/FRC-80(V)1, AN/FRC-80(V)2,
AND AN/FRC-80(V)3

This copy is a reprint which includes current pages from Changes 1 through 4.

HEADQUARTERS, DEPARTMENT OF THE ARMY

APRIL 1970

WARNING

Operator and maintenance personnel should be familiar with the requirements of TB SIG 291 before attempting installation or operation of the equipment covered in this manual. Failure to follow requirements of TB SIG 291 could result in injury or DEATH.

WARNING

Dangerous voltages (−1,350 v and −750 v) exist in this equipment. Be careful when working on the power supplies and klystron amplifier circuits. The applicable power supply and transmitter must be deenergized when working on these circuits.

TECHNICAL MANUAL
No. 11-5820-785-12

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *23 April 1970*

OPERATOR'S AND ORGANIZATIONAL MAINTENANCE MANUAL RADIO SETS AN/FRC-80(V)1 (NSN 5820-00-554-4239), AN/FRC-80(V)2 (NSN 5820-00-351-2980), AND AN/FRC-80(V)3 (NSN 5820-00-145-6829)

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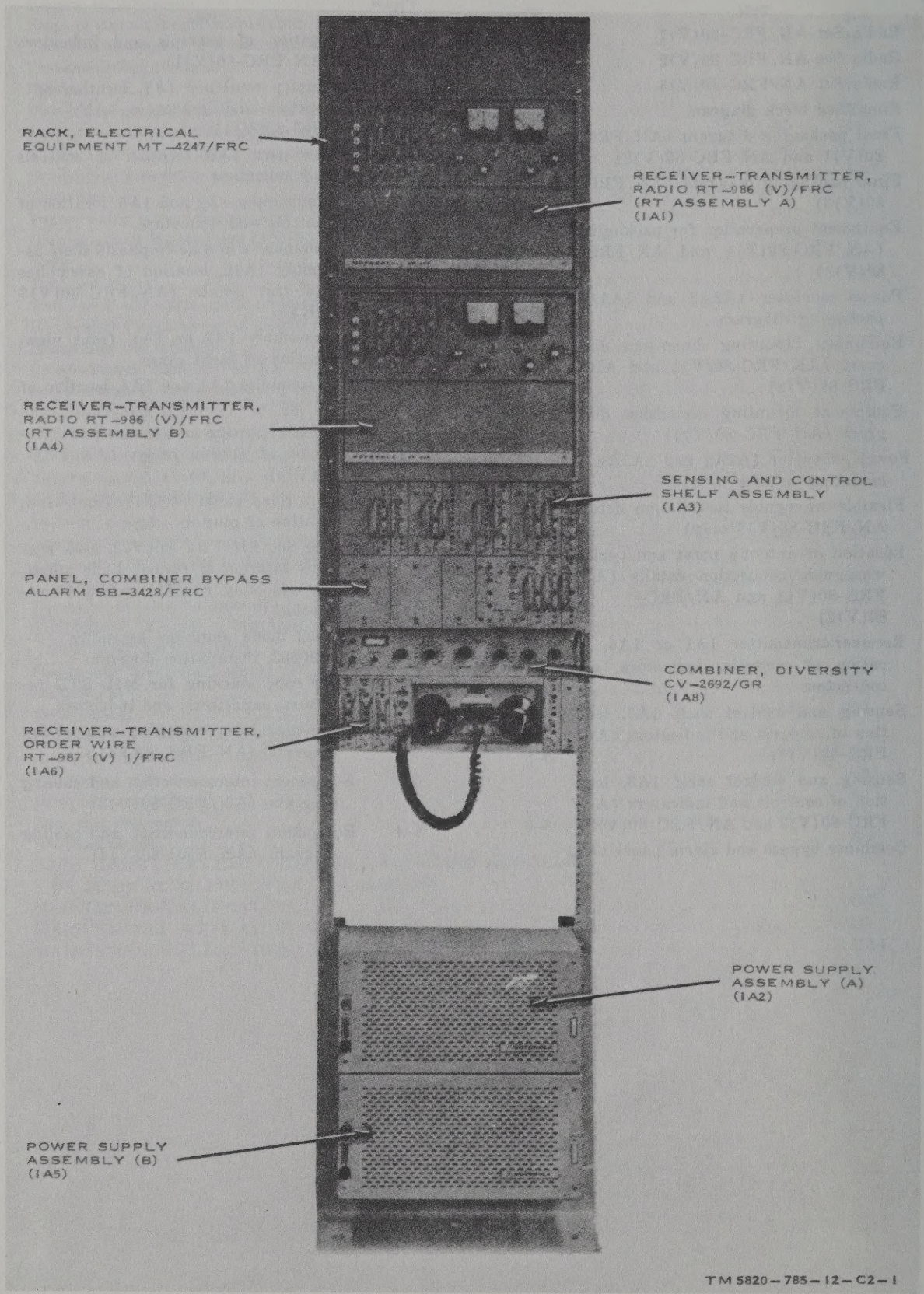


Figure 1-1 Radio Set AN/FRC-80(V)1.

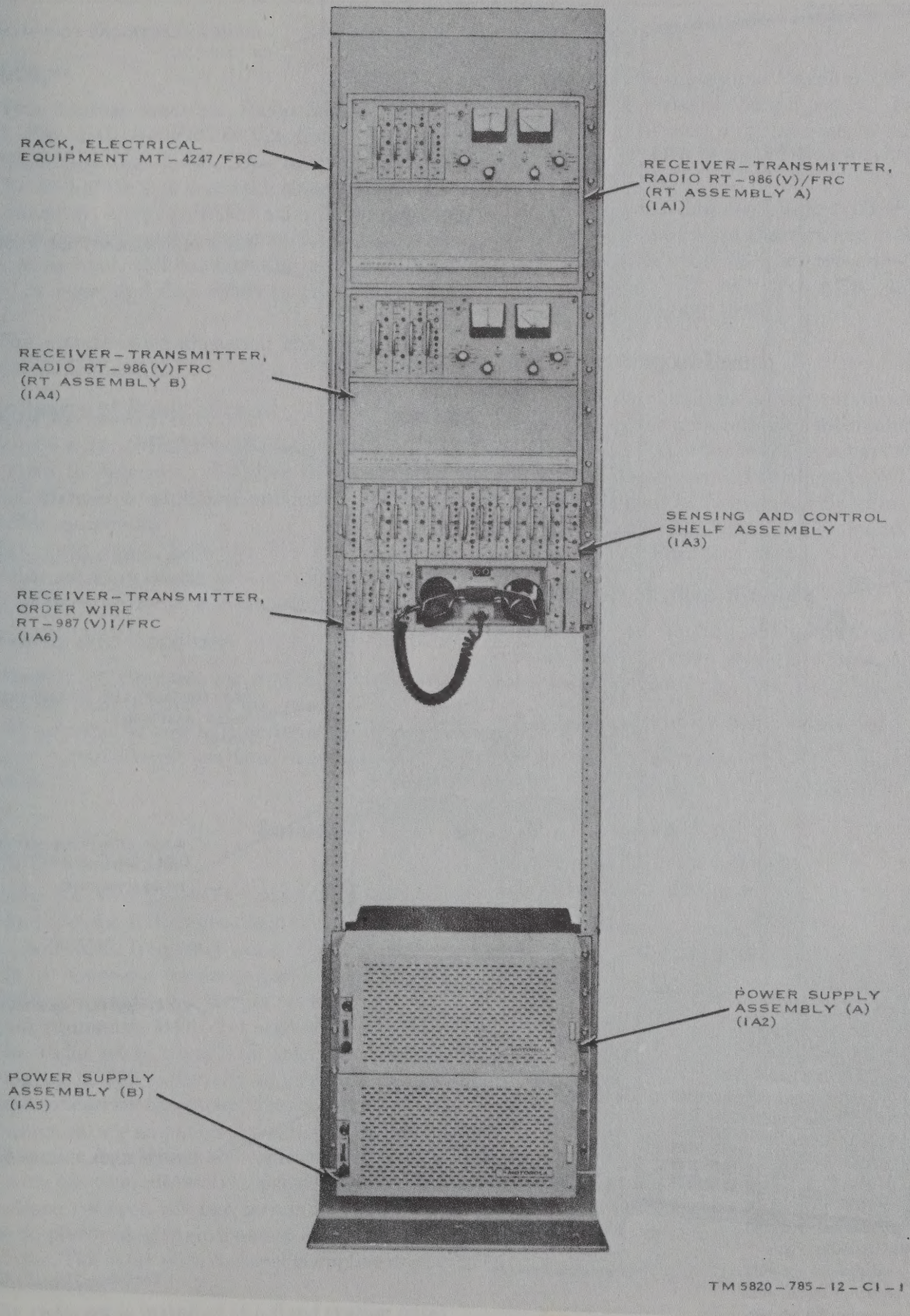


Figure 1-1.1. Radio Set AN/FRC-80(V)2.

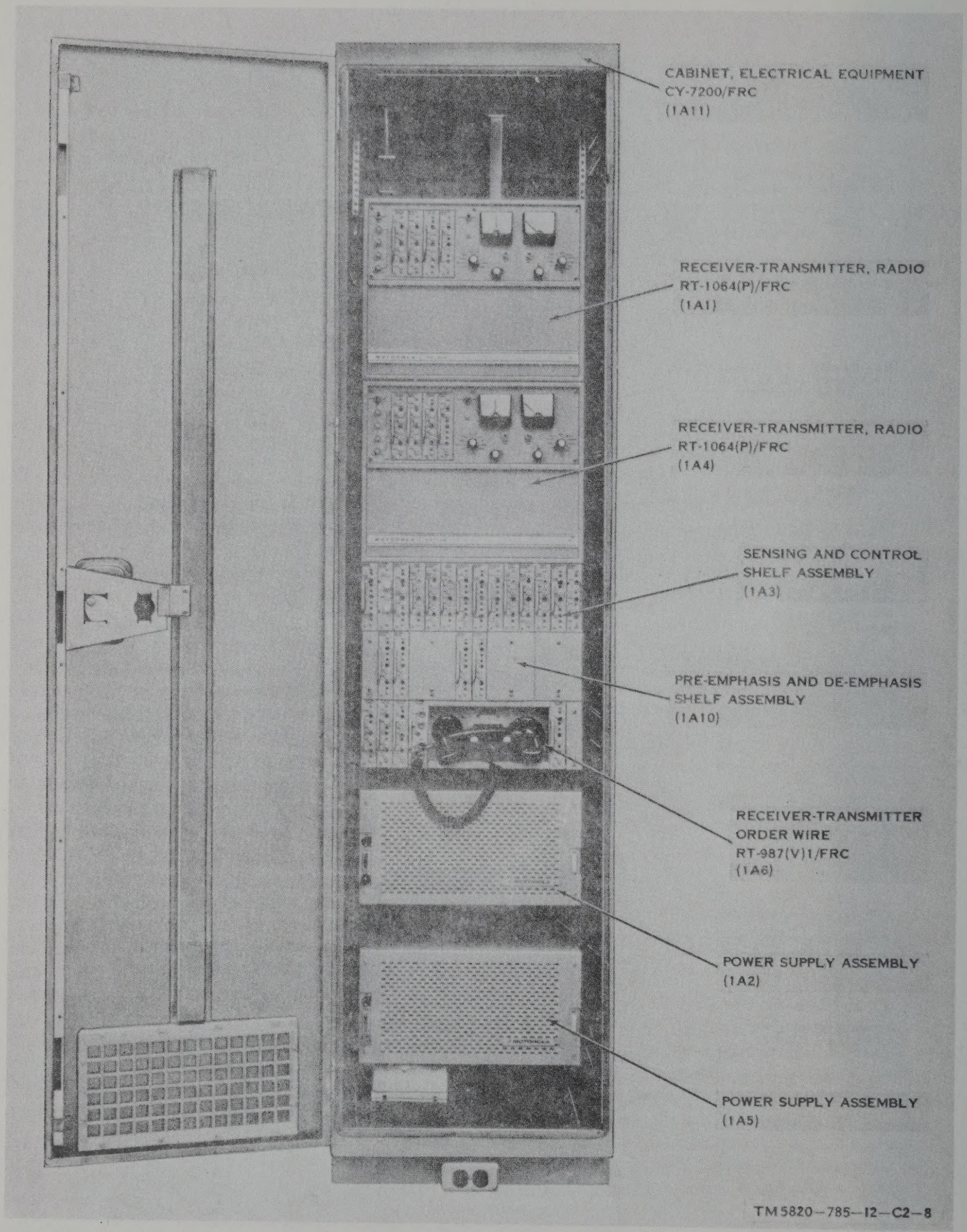


Figure 1–1.2 Radio Set AN/[illegible] RC–80(V)3.

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This manual describes Radio Sets AN/FRC-80(V)1 (fig. 1-1), AN/FRC-80(V)2 (fig. 1-1.1) and AN/FRC-80(V)3 (fig. 1-1.2). The term Radio Set AN/FRC-80(V)(*) in this manual includes all models. The manual covers installation, operation, operator/organizational maintenance, use with auxiliary equipment, instructions for shipment and limited storage, and demolition to prevent enemy use.

b. The maintenance allocation chart appears in appendixes C and C.1.

1-2. Indexes of Publications

a. DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are modifications work orders (MWO's) pertaining to the equipment.

1-3. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Packaging Improvement Report) as prescribed in AR 700-58/NAVSUPINST 4030.29/AFR 71-13/MCO P4030.29A, and DSAR 4145.8.

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33A/AFR 75-18/MCO P4610.19B, and DSAR 4500.15.

1-3.1 Reporting of Errors

Report of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded direct to Commander, US Army Electronics Command, ATTN: AMSEL-MA-Q, Fort Monmouth, NJ 077003.

1-3.2 Administrative Storage

For procedures, forms, and inspections required during administrative storage of this equipment, refer to TM 740-90-1.

1-3.3 Destruction of Army Materiel

Destruction of Army materiel to prevent enemy use shall be as prescribed in TM 750-244-2.

Section II. DESCRIPTION AND DATA

1-4. Purpose and Use

a. Radio Set AN/FRC-80(V)(*) provides a point-to-point line-of-sight RF communications link in the 7750- to 8400-MHz frequency band. The radio set is used in a wideband communications system to provide two-way radio connections between external multiplex equipment located at separate terminals.

b. The radio set is capable of transmitting and receiving up to 600 externally multiplexed single-sideband subcarrier channels. The subcarrier channels (baseband) are amplified to frequency modulate the RF carrier. In addition, the radio set contains an order wire (service channel) to provide voice communications between the two terminals of the link for use in performing maintenance and alignment procedures. The order wire channel is applied direct to the baseband.

c. The radio set is installed at a fixed station (site) near the multiplex equipment to be used for its subcarrier input. The operating range is limited to line-of-sight.

1-5. Technical characteristics

Distance range	Up to 50 miles (80 kilometers) line-of-sight (depending upon antenna size and type and path obstruction clearance).
Frequency range	7750 to 8400 MHz
Channel capacity	600 single-sideband channels maximum; 600, 300, 240, or 120 single-sideband channels nominal.
Type of modulation	Fm
Receiver IF bandwith	30, 16, or 10 MHz
Primary power	110/220v ac ±10%; 50/60 Hz, single-phase or -48v dc ±10%.
Power consumption	110v ac: 4.8 amperes 220v ac: 2.4 amperes -48v dc: 8.8 amperes

Power output:
- At antenna port ..... +28.5 dbm minimum
- At transmitter ..... +30 dbm minimum

Rms deviation ..... 200 kHz (AN/FRC-80(V)1) 140 kHz (AN/FRC-80(V)2 or AN/FRC-80(V)3).

Frequency stability ..... ±0.005% (0° C to +55°C)

Input level ..... -45 dbm (1.5 mv, 75 ohms) minimum.

Output level ..... -15 dbm (47.5 mv, 75 ohms)

Frequency response ..... Varies no more than 0.5 db over any 250 kHz segment between 60 kHz and 2540 kHz; within +1, -2 db of 36 kHz reference level between 12 kHz and 60 kHz.

Intermodulation ..... 55 db minimum noise power ratio (NPR) for 300 channels, 57 db for 240 channels, or 58 db for 120 channels without pre-emphasis and de-emphasis; 55 db for 600 channels with pre-emphasis and de-emphasis.

Alarms:

Receiver modulation pilot monitor.	5 db drop in signal level at input to receiver pilot receiver.
Transmitter frequency stability/power monitor.	5 db drop in signal level at input to transmitter control.
Transmitter modulation pilot monitor.	5 db drop in signal level at input to transmitter pilot reciever.

Receiver muting ..... 30 db S/N squelch adjustment.

Noise figure ..... 12 db maximum

Order wire:

Telephone termination input level.	-16 dbm
Telephone termination output level.	+7 dbm

Frequency response ..... Response at 300 Hz and 3 kHz is between +1 and -3 db of the response at 1 kHz.

Signaling ..... 2600 Hz audible tone and visible signaling indicator.

Termination facilities ..... Loudspeaker
Handset
Facilities for plug-in headset
Facilities for connecting isolated 4-wire line.

1-6. Components and Dimensions

a. The components of Radio Set AN/FRC-80(V) (*) are listed in appendix B.

b. In AN/FRC-80(V)1 and AN/FRC-80(V)2, all components are mounted in a common rack which is 7 1/2 feet high by 21 inches wide by 15 inches deep (fig. 2-4). The fully equipped rack weighs approximately 500 pounds. The equipment may be mounted on an optional 6 foot high rack in some installations where space is limited.

c. In AN/FRC-80(V)3, all components are mounted in an rfi cabinet which is 7 1/4 feet high by 21 inches wide by 26 inches deep. The fully equipped cabinet weighs approximately 700 pounds.

1-7. Description of Radio Set AN/FRC-80(V)(*)

(fig. 1-1)

a. The radio set consists of two receiver-transmitters (rt assemblies), a sensing and control shelf assembly, a combiner bypass and alarm panel, two power supply assemblies, a diversity combiner, and an order wire. In the AN/FRC-80(V)2 and AN/FRC-80(V)3, the combiner bypass and alarm panels are not used. Comparable functions are performed in the sensing and control shelf. Radio Set AN/FRC-80(V)3 contains a pre-emphasis and de-emphasis shelf for 600-channel operation. In the AN/FRC-80(V)1 and AN/FRC-80(V)2, all components are mounted on a common relay rack. In the AN/FRC-80(V)3, all components are mounted in an rfi cabinet. Side rails within the cabinet serve as the equipment rack. Waveguide sections, circulators, isolators, etc, are mounted within the two assemblies.

b. Common names for all components and subassemblies of Radio Set AN/FRC-80(V) (*) are listed below. These common names are used

throughout the technical manuals for this equipment. The table is organized in reference designation order. Where applicable, official nomenclature and manufacturer's model numbers (or other descriptive identification) are included in the chart for cross-reference. Wherever a model number is applicable, that number is printed or stamped on the module.

Ref Desig	*Nomenclature*	*Manufacturer's identification*	*Common name*
1	Radio Set AN/FRC–80(V)1	MR–300 Microwave Terminal	Radio set.
1A1	Receiver-Transmitter, Radio RT–986(P)/FRC.	*MA–300–DA–SP1 RF Assembly.	Rt assembly (A).
		**MA–300–DA–SP3 RF Assembly.	Rt assembly (A).
1A1		***MA–300–DB–SP2 RF Assembly.	Rt assembly (A).
1A1A1	*Limiter, Electrical Noise CN–1317/FRC.	MB 188B–SP1 Squelch Receiver.	Squelch receiver.
1A1A1	**Limiter, Electrical Noise CN–1345/FRC.	MB188B–SP2 Squelch Receiver.	Squelch receiver.
1A1A2	Control, Receiver C–8434/FRC.	MB 157 Receiver Afc	Receiver afc.
1A1A3	Control, Klystron C–8435/FRC.	MB 159A Transmitter Afc	Transmitter afc.
1A1A4	Amplifier-Modulator AM–6262/FRC.	MB 158 Modulation Amplifier	Modulation amplifier.
1A1A5	Amplifier-Demodulator AN–6261/FRC.	MU572–Opt B IF Amplifier	IF amplifier.
1A1A5	Amplifier-Demodulator AM–6325/FRC.	MU572–Opt C IF Amplifier	IF amplifier.
1A1A5	Amplifier-Demodulator AM–6326/FRC.	MU572–Opt D IF Amplifier	IF amplifier.
1A1A6	Equalizer, Time Delay CN–1320/FRC.	MU585 Time-Delay Equalizer	Time-delay equalizer.
1A1A7		Mixer-local oscillator-preamplifier.	Mixer-local oscillator-preamplifier.
1A1A7A1		Local oscillator subassembly	Local oscillator subassembly.
1A1A7A2		IF preamplifier subassembly	IF preamplifier.
1A1A7A3		Mixer waveguide subassembly	Mixer waveguide subassembly.
1A1A8		Condenser assembly	Condenser.
1A1A9		Transmitter waveguide assembly.	Transmitter waveguide assembly.
1A2		Power supply assembly	Power supply assembly (A).
1A2A1	Power Supply PP–6414–FRC	MA363 Power Supply	Power supply chassis.
1A2A1A1	Comparator-Control C–8437/FRC.	MB213 Control Amplifier	Control amplifier.
1A2A2	Power Supply PP–6413/FRC	MU587 Power Converter	Power converter.
1A2A2	***Power Supply PP–6735/FRC (Optional for PP–6413/FRC for 48V dc primary power)	MU575–SP1 Power Converter	Power converter.
1A3		Sensing and control shelf assembly.	Sensing and control shelf assembly.
1A3A1	Control, Transmitter C–8427/FRC.	MB161–SP1 Transmitter Control.	Transmitter control (A).
1A3A2	Monitor, Transmitter-Receiver ID–1696/FRC.	MB224 Pilot receiver	Transmitter pilot receiver (A).
1A3A3	Monitor, Transmitter-Receiver ID–1696/FRC.	MB224 Pilot Receiver	Receiver pilot receiver (A).

Footnotes at end of table.

Ref Desig	*Nomenclature*	*Manufacturer's identification*	*Common name*
1A3A4	*Amplifier, Audio Frequency-Radio Frequency AM-6242/FRC.	MB225 Baseband Amplifier	Baseband amplifier (A).
1A3A4	**Switching Unit, Baseband SA-1742/FRC.	MB218 Baseband Switch	Baseband switch (A).
1A3A5	*Amplifier, Audio Frequency Radio Frequency AM-6242/FRC.	MB225 Baseband Amplifier	Baseband amplifier (B).
1A3A5	**Switching Unit, Baseband SA-1742/FRC.	MB218 Baseband Switch	Baseband switch (B).
1A3A6	Monitor, Transmitter-Receiver ID-1696/FRC.	MB224 Pilot Receiver	Receiver pilot receiver (B).
1A3A7	Monitor, Transmitter-Receiver ID-1696/FRC.	MB224 Pilot Receiver	Transmitter pilot receiver (B).
1A3A8	Control, Transmitter C-8427/FRC.	MB161-SP1 Transmitter Control.	Transmitter control (B).
1A3A9	Control, Transmitter Transfer C-8436/FRC.	MB165 RF Control	RF control.
1A3A10	**Relay Assembly RE-1050/FRC.	MB190A Alarm Board	Alarm Board.
1A3A11	**Test Module, Baseband Monitoring TS-2996/FRC.	MB168A Opt B Baseband Monitor.	Baseband monitor.
1A3A12	**Control, Alarm C-8553/FRC	MB162B Receiver Control	Receiver control (B).
1A3A13	**Limiter, Electrical Noise CN-1346/FRC.	MB241 Squelch Control	Squelch control.
1A3A14	**Control, Alarm C-8553/FRC	MB162B Receiver Control	Receiver control (A).
1A3A15		**MK1046 Alarm Relay Panel Assembly.	Alarm relay panel.
1A4		*MA300-DA-SP1 RF Assembly (same as 1A1).	Rt assembly (B).
1A4		**MA300-DA-SP3 RF Assembly (same as 1A1).	Rt assembly (B).
1A4		***MA300-DB-SP2 RF Assembly (same as 1A1).	Rt assembly (B).
1A5		Power Supply Assembly (same as 1A2).	Power supply assembly (B).
1A6	Receiver-Transmitter, Order Wire RT-987(V)1/FRC.	MA364-B-S5-P4-V1-J2 Baseband Utility Channel.	Order wire.
1A6A1	Receiver, Order Wire R-1661/FRC.	MB185 Baseband Receiver	Baseband receiver.
1A6A2	Trasmitter, Order Wire T-1162/FRC.	MB184 Baseband Transmitter	Baseband transmitter.
1A6A3	Signaling Unit, Order Wire TA-842/FRC.	MB183-Opt B Signaling Oscillator Receiver.	Signaling oscillator-receiver.
1A6A4	Coupler, Order Wire-Telephone Circuits CU-1912/FRC.	MA262-V1-J2 Extension Line Termination.	Extension line termination.
1A6A5	Indicator-Direct Current Combiner ID-1701/FRC.	MB223 Dc Combiner	Dc combiner.
P/O 1A6	Handset H-303/U	MK911 Handset	Handset.
P/O 1A6	Monitor Panel, Telephone TA-844/FRC.	MK904 Telephone Panel	Telephone panel.
P/O 1A6	Chassis, Electrical Equipment, Rack Mounted CH-650/FRC.	MK905 Card Cage and Cable	Order wire chassis.
1A7	*Panel, Combiner Bypass Alarm, SB-3428/FRC.	MK1034 Combiner Bypass and Alarm Panel.	Combiner bypass and alarm panel.

Footnotes at end of table.

Ref Desig	Nomenclature	Manufacturer's identification	Common name
1A7A1	*Monitor, Transmitter-Receiver ID–1696/FRC.	MB224 Pilot Receiver	Combiner input 1 pilot receiver.
1A7A2	*Monitor, Transmitter-Receiver ID–1696/FRC.	MB224 Pilot Receiver	Combiner output pilot receiver.
1A7A3	*Monitor, Transmitter-Receiver ID–1696/FRC.	MB224 Pilot Receiver	Combiner input 2 pilot receiver.
1A8	*	Diversity combiner	Diversity combiner.
1A9		RF switch assembly	RF switch assembly.
1A10***		Pre-emphasis and De-emphasis shelf assembly.	Pre-emphasis and de-emphasis shelf.
1A10A1	***Amplifier, Pre-emphasis AM–6480/FRC.	MB216–Opt B Pre-emphasis Board.	Pre-emphasis board (A).
1A10A2	***Amplifier, Pre-emphasis AM–6480/FRC.	MB216–Opt B Pre-emphasis Board.	Pre-emphasis board (B).
1A10A3	***Amplifier, De-emphasis AM–6490/FRC.	MB217–Opt B De-emphasis Board.	De-emphasis board (A).
1A10A4	***Amplifier, De-emphasis AM–6490/FRC.	MB217–Opt B De-emphasis Board.	De-emphasis board (B).
1A11	***Cabinet, Electrical Equipment CY–7200/FRC.	MK1167 Cabinet, RFI	Cabinet.
P/O 1	+Rack, Electrical Equipment MT–4247/FRC.	MK838 Equipment Rack	Rack.

*AN/FRC–80(V)1 only.
**AN/FRC–80(V)2 and AN/FRC–80(V)3.
***AN/FRC–80(V)3 only.
+AN/FRC–80(V)1 and AN/FRC–80(V)2.

1–8. Description of Major Components

a. Rt Assemblies. (fig. 3–1). Two rt assemblies are required for space diversity operation. The two rt assemblies are mounted one above the other at the top of the equipment rack. Each rt assembly contains four front panel plug-in modules (squelch receiver, receiver afc, transmitter afc, and modulation amplifier) and two internal plug-in modules (i–f amplifier and time delay equalizer). A klystron tube, used to generate the rf carrier, is enclosed in a temperature controlled oven which uses a vapor cooling system to maintain transmitter frequency stability. The condenser for the vapor cooling system is located on the rear of the rt assemblies. Metering and control functions are provided on the upper half of the rt assembly front panel.

b. Sensing and Control Shelf Assembly. (fig. 3–2) The sensing and control shelf assembly is mounted on the rack immediately below the rt assemblies. It provides fault sensing and control of the two rt assemblies. On the AN/FRC–80(V)1, it contains nine plug-in modules (fig. 3–2); two transmitter control modules, two baseband amplifier modules, four pilot receiver modules, and one RF control module. On the AN/FRC–80(V)2, it contains 14 plug-in modules (fig. 3–2.1); two transmitter control modules, two receiver control modules, four pilot receivers, two baseband switch modules, one squelch control module, one alarm board, one RF control module, and one baseband monitor module.

c. Combiner Bypass and Alarm Panel (AN/FRC–80(V)1 Only) (fig. 3–3). The combiner bypass and alarm panel is mounted on the equipment rack immediately below the sensing and control shelf. It contains three pilot receiver plug-in modules and a combiner bypass switch panel.

d. Diversity Combiner (AN/FRC–80(V)1 Only) (fig. 3–4). The diversity combiner is mounted on the rack immediately below the combiner bypass and alarm panel. The combiner power switch, adjustment controls, and baseband level monitor meter are located on the front panel. All input and output connectors are located on the rear panel. The diversity combiner contains its own power supply. For detailed information on the diversity combiner, refer to TM 11–5805–570–15.

e. Order Wire. (fig. 3–5) The order wire is

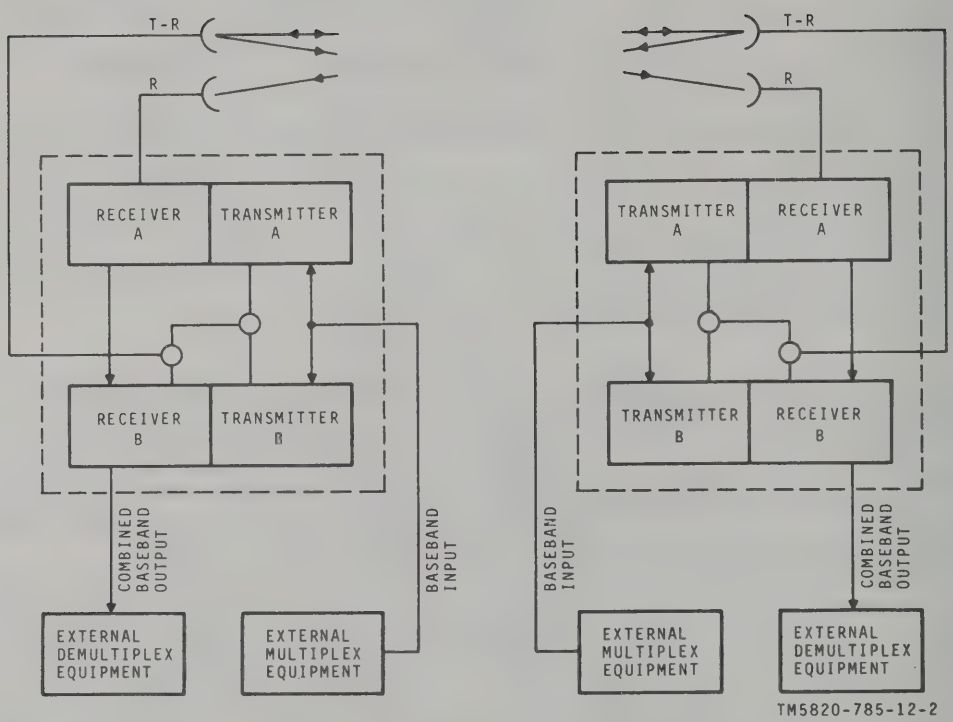


Figure 1–2. Simplified block diagram.

mounted on the rack immediately below the diversity combiner. (AN/FRC-80(V)1) or sensing and control shelf (AN/FRC-80(V)2). It contains five plug-in modules and a handset which is cradle-mounted on the front panel. The plug-in modules include a baseband receiver, a baseband transmitter, a signaling oscillator-receiver, an extension line termination, and a dc combiner.

f. Power Supply Assembly (fig. 3-6). The radio set contains two power supply assemblies which are mounted one above the other at the bottom of the equipment rack. The power supply assembly consists of a power supply chassis and a power converter. The power converter, mounted on the rear of the power supply assembly, contains one fuse. The power supply chassis contains one plug-in control amplifier module. The front panel of the power supply chassis contains a primary power switch, fuse, power indicator lamp and a high voltage indicator lamp.

1-8.1 Pre-Emphasis and De-Emphasis Shelf Assembly (AN/FRC-80(V)3 Only)

(fig. 3-2.2)

The pre- and de-emphasis shelf assembly is mounted on the equipment rack immediately below the sensing and control shelf. It contains two pre-emphasis modules and two de-emphasis modules. A connector bracket on the rear of the shelf provides baseband input connection.

1-9. Additional Equipment Required

Equipment	*Purpose*
Antenna (2 required)	Radiation of transmitter output and reception of received signals in space diversity configuration.
Multiplex set	Multiplexing the subcarrier channels for the baseband input and demultiplexing the baseband output.

1-10. System Application

Radio Set AN/FRC-80(V) (*) provides line-of-sight communications links between designated sites in the communications system (fig. 1-2). Two terminals of the radio set (one at each site) are required for two-way, point-to-point communication between the sites. The transmitter provides an rf carrier which requires a baseband modulation input from an external multiplex equipment. The receiver provides a baseband output to an external demultiplex equipment.

1-11. Differences in Models

a. This manual covers Radio Sets AN/FRC-80(V)1, AN/FRC-80(V)2, and AN/FRC-80(V)3. The radio sets are similar in operation except that the AN/FRC-80(V)1 uses a ratio-squared combining system for the receiver, and the AN/FRC-80(V)2 and AN/FRC-80(V)3 use a linear combining system. Components of the AN/FRC-80(V)1 and AN/FRC-80(V)2 are mounted on a standard relay rack, and components of the AN/FRC-80(V)3 are mounted in an rfi cabinet. See table below for differences in models.

b. In both the AN/FRC-80(V)1 and AN/FRC-80(V)2, one of three i-f amplifier options may be used in the receiver. Option B is used for 300- or 600-channel systems, option C is used for 120-channel systems, and option D is used for 240-channel systems. The i-f amplifiers are interchangeable only in systems with the same channel rating (option). The three i-f amplifier versions use different i-f filter and phase equalizer subassemblies A1 and different internal jumper configurations. In the AN/FRC-80(V)3, the option B i-f amplifier and a pre-emphasis and de-emphasis shelf assembly are used for 600-channel operation.

Item	*AN/FRC-80(V)1*	*AN/FRC-80(V)2*	*AN/FRC-80(V)3*
Assemblies for receiver combining.	Uses baseband amplifiers 1A-3A4 and 1A3A5 on sensing and control shelf, combiner bypass and alarm panel 1A7, and diversity combiner 1A8 for ratio squared combining.	Uses baseband switches 1A-3A4 and 1A3A5, squelch control 1A3A13, and baseband monitor 1A3A11 on sensing and control shelf for linear combining.	Same as AN/FRC-80(V)2.
Manual receiver selection	Uses MAN A-AUTO-MAN B switch on combiner bypass and alarm panel 1A7. Lamps RX A and RX B indicate channel selected.	Uses AUTO OFF switches on baseband switch modules 1A3A4 and 1A3A5. Lamps CH OP indicate channel selected.	Same as AN/FRC-80(V)2.
Receiver alarm lamps	RX A, RX B, COMP AMP, and COMB BYPASS lamps on combiner bypass and alarm panel 1A7, FAULT lamps on receiver pilot receivers 1A3A3 and 1A3A6, and FAULT lamps on combiner pilot receivers 1A-7A1, 1A7A2, and 1A7A3.	CH OP lamps on baseband switches 1A3A4 and 1A-3A5, A LEV FAULT and B LEV FAULT lamps on squelch control 1A3A13, SQ FAULT lamps on receiver control modules 1A-3A12 and 1A3A13, and FAULT lamps on receiver pilot receivers 1A3A3 and 1A3A6.	Same as AN/FRC-80(V)2.
External connections to multiplex.	At 1A7J26 on combiner bypass and alarm panel 1A7.	At 1A3J26 on sensing and control shelf 1A3.	Baseband input at 1A11J1 on rfi cabinet. Base band output at 1A11J2 on rfi cabinet.
Alarm equipment connections.	At block on back of combiner bypass and alarm panel 1A7.	At block on back of sensing and control shelf 1A3.	From block on back of sensing and control shelf 1A3 through feed-through filters 1A11FL2 through 1A11FL27 as selected at installation.
Power supply alarms	None	AUX A PWR FAULT and AUX B PWR FAULT lamps on alarm board 1A3A10.	Same as AN/FRC-80(V)2.
Primary power	110/220V ac input to Power Supply PP-6413/FRC.	Same as AN/FRC-80(V)1	110/220V ac input to Power Supply PP-6413/FRC or 48V dc input to Power Supply PP-6735/FRC (as selected at installation).
Ac convenience outlets	None		At front and rear bottom of rfi cabinet.

CHAPTER 2

INSTALLATION

WARNING

During installation of this equipment conform to all safety requirements set forth in TB SIG 291. Injury or DEATH could result from failure to comply with safe practices.

Section I. SYSTEMS PLANNING

2-1. General

Since local surroundings vary at each site, it is beyond the scope of this manual to cover every installation situation. The information provided here, therefore, furnishes basic requirements for any microwave system. The installation objective is that a line-of-sight microwave path be established between sites without interference from (or to) other electronic equipment, and that reliable operation under adverse weather conditions be maintained. In general, site selection is based on local conditions at the proposed site and the terrain along the microwave path.

2-2. Channel Loading Capabilities

The radio set is capable of transmitting a maximum of 600 channels. Some radio sets may have different band width filters in the input to the i-f amplifier, i.e., 10 MHz for 120-channel capability, 16 MHz for 240-channel capability, or 30 MHz for 300- or 600-channel capability.

2-3. Antenna Requirements

The radio set requires two parabolic antennas, one for transmit-receive functions and one for receive functions only. The antennas (not supplied as part of the radio set) are connected to the equipment rack with rigid runs of RG-51/waveguide or equivalent. The antenna ports at the top of the equipment rack are UG-51/U flanges at the end of 24-inch sections of flexible waveguide on AN/FRC-80(V)1 and AN/FRC-80(V)2 or at the top of the rfi cabinet on AN/FRC-80(V)3).

2-4. Range of Transmission

Microwave transmission requires a clear line-of-sight path. Transmission range may be up to 50 miles depending on antenna height, type of terrain, and path obstacle clearance. A path survey should be performed to assure that sufficient obstacle clearance is provided to yield a strong signal at the receive antennas.

2-5. Other Technical Considerations

The required baseband input to the transmitter is supplied by external multiplex equipment. The multiplex equipment must be capable of supplying the required number of channels at a minimum level of −45 dBm (1.5 mV into 75 ohms). Primary power may be either 110 or 220V ac, 50 to 60 Hz, single phase or (for AN/FRC-80(V)3) 48V dc when using Power Supply PP-6735/FRC. When very long video cables (exceeding 200 feet), are used, balanced line should be used with a transformer at the radio set end. A terminal board is provided on the rear of the radio set for connection of alarms to external indicating devices. Dry, form C alarm relay contact outputs are available at the terminal block. On AN/FRC-80(V)3, connections must be made from the terminal board through filters at the top of the rfi cabinet to the external indicating devices.

Section II. SERVICE UPON RECEIPT OF EQUIPMENT

2-6. Site Selection Requirements

a. Site Location Requirements. The radio set must be housed in a building which provides a dry protected shelter. The floor below the equipment rack must be capable of supporting a 500-pound load for AN/FRC-80(V)1 and AN/FRC-80(V)2, or a 700-pound load for AN/FRC-80(V)3. Sufficient space must be available at the site for mounting antennas and for erecting towers and guy wires if required. The site must be readily accessible to maintenance personnel in all weather conditions.

b. Space Requirements. The equipment rack, with all equipment mounted, requires a floor space of approximately two feet by two feet. As a minimum, two additional feet of clear space

should be available at the front and rear of the rear of the rack for maintenance access. The height of the equipment rack may be either six feet or seven-and-one-half feet. Ceiling height above the rack should allow enough clearance to make antenna waveguide connections.

c. Power Requirements. Primary power required for the radio set is either 110 or 220V ac, ±10%, 50-60 Hz, single phase. The power source must be capable of supplying 4.8 amperes at 110V ac or 2.4 amperes at 220V ac. A power connection box (with mounting screws) and three solderless connectors are supplied with the radio set. The power connection box may be mounted on the upper left-hand rear side of the rack or near the bottom rear on either side of the rack where threaded holes are provided.

2-7. Packaging Data

a. The radio set is packaged in accordance with Specification MIL-P-116, Method II. Components of the radio set, except for the two power converters, are mounted on the equipment rack. The equipment rack is packaged in a wooden shipping crate and the two power converters are packaged in a wooden box (figs. 2-1 and 2-3). The crate and box are strapped together forming a single package for shipment. Dimensions of the final package are shown in figure 2-1. For AN/FRC-80(V)1 and AN/FRC-80(V)2, shipping weight is 594 pounds; volume is 38 cubic feet. For AN/FRC-80(V)3, shipping weight is 920 pounds; volume is 52 cubic feet.

b. Corners and sharp edges of the components mounted on the equipment rack for AN/FRC-80(V)1 and AN/FRC-80(V)2 are covered with cushioning material (fig. 2-2) to protect the vaporproof barrier. The four corners of the cabinet for AN/FRC-80(V)3 are covered with cushioning material to protect the vaporproof barrier. Technical manuals and accessory items are packaged in a cardboard box which is taped to the equipment rack. Other taping, cushioning, and supporting material and its use are shown in figure 2-2.

WARNING

(For AN/FRC-80(V)1 and AN/FRC-80(V)2)
After the cushioning and taping are completed, place the equipment into its wooden crate and mark as shown in figure 2-1. If it is not possible to ship the container upright, palletize the container so that the equipment will be carried on its side.

WARNING

(For AN/FRC-80(V)3)
Cushion the internal components within the cabinet for vibration protection. Place the equipment cabinet into the shipping crate on its back and mark as shown in figure 2-1.1. If it is not possible to transport the container upright, palletize and ship on its back.

2-8. Unpacking Instructions

WARNING

Observe TOP marking on the shipping crate when standing crate on end. Failure to stand the shipping crate on the base plate end could cause it to topple over causing possible injury to personnel and damage to the equipment.

a. Place the equipment package in the building or shelter in which it is to be installed and near the installation area.

b. Cut and fold back the metal straps holding the equipment to the skid (fig. 2-1).

c. Remove the power converter package from the shipping crate.

d. Lift the shipping crate off the skid and stand it on end, observing the TOP marking.

e. Remove the nails from all sides and both ends of the shipping crate. Remove all four sides and the top end. Cut vapor barrier as necessary.

CAUTION

To minimize the possibility of damage to the equipment, be careful when using nailpullers and other uncrating tools. Do not use any part of the equipment as a leverage point for crowbars or other tools. Do not exert pressure against waveguide sections.

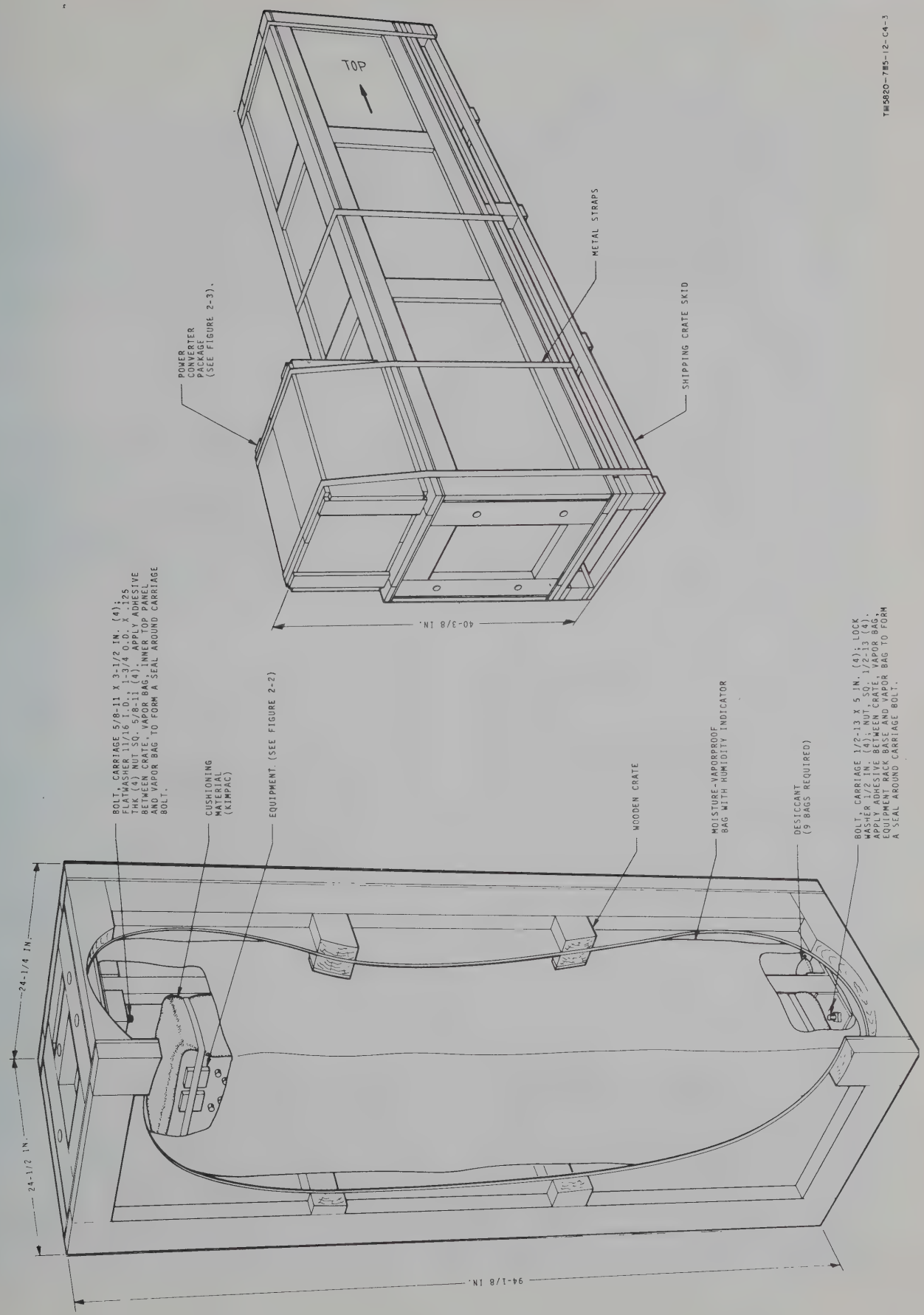


Figure 2-1. Final packaging diagram (AN/FRC-80(V)1, 2).

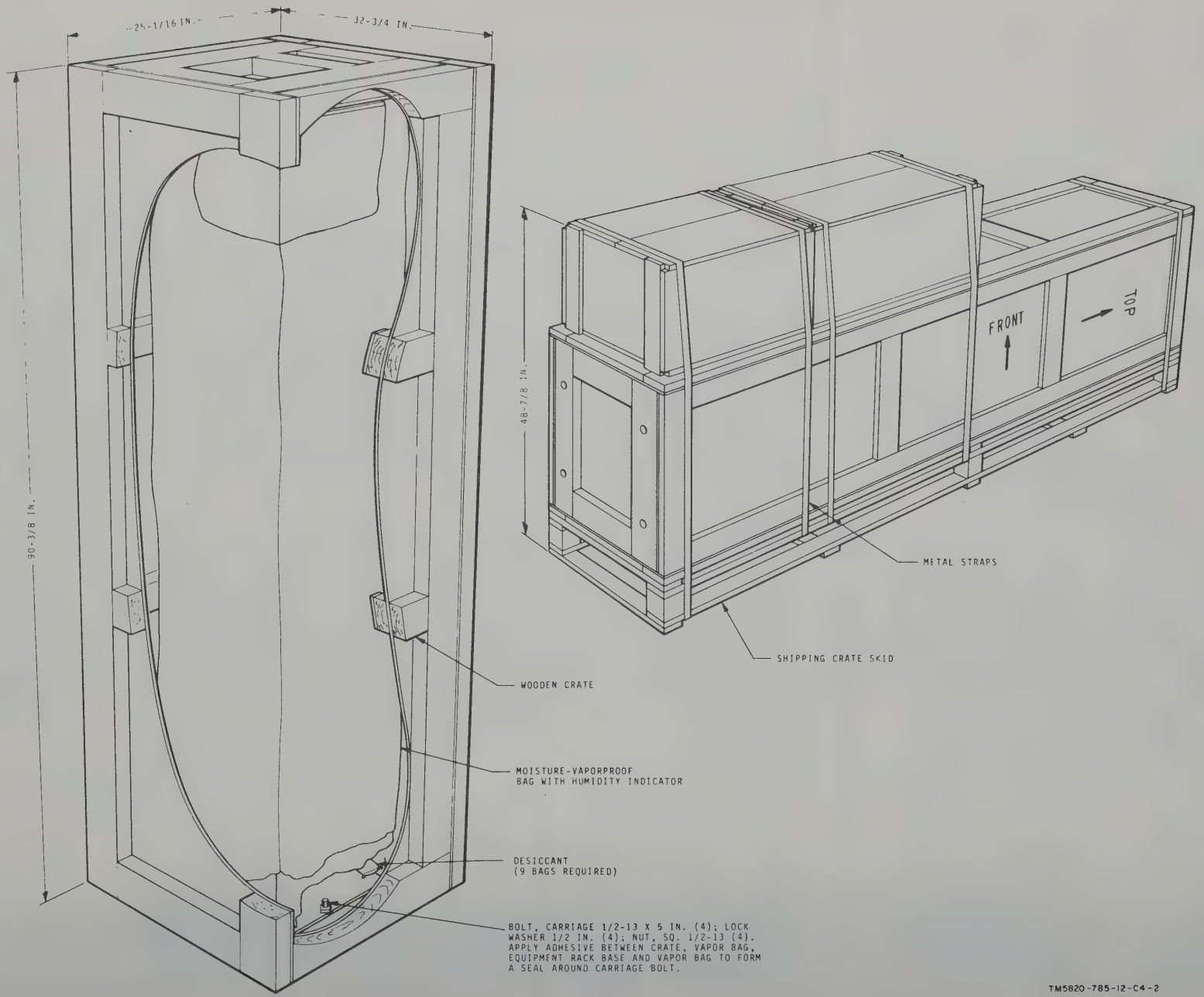


Figure 2-1.1. Final packaging diagram A(AN/FRC-80(V) 3).

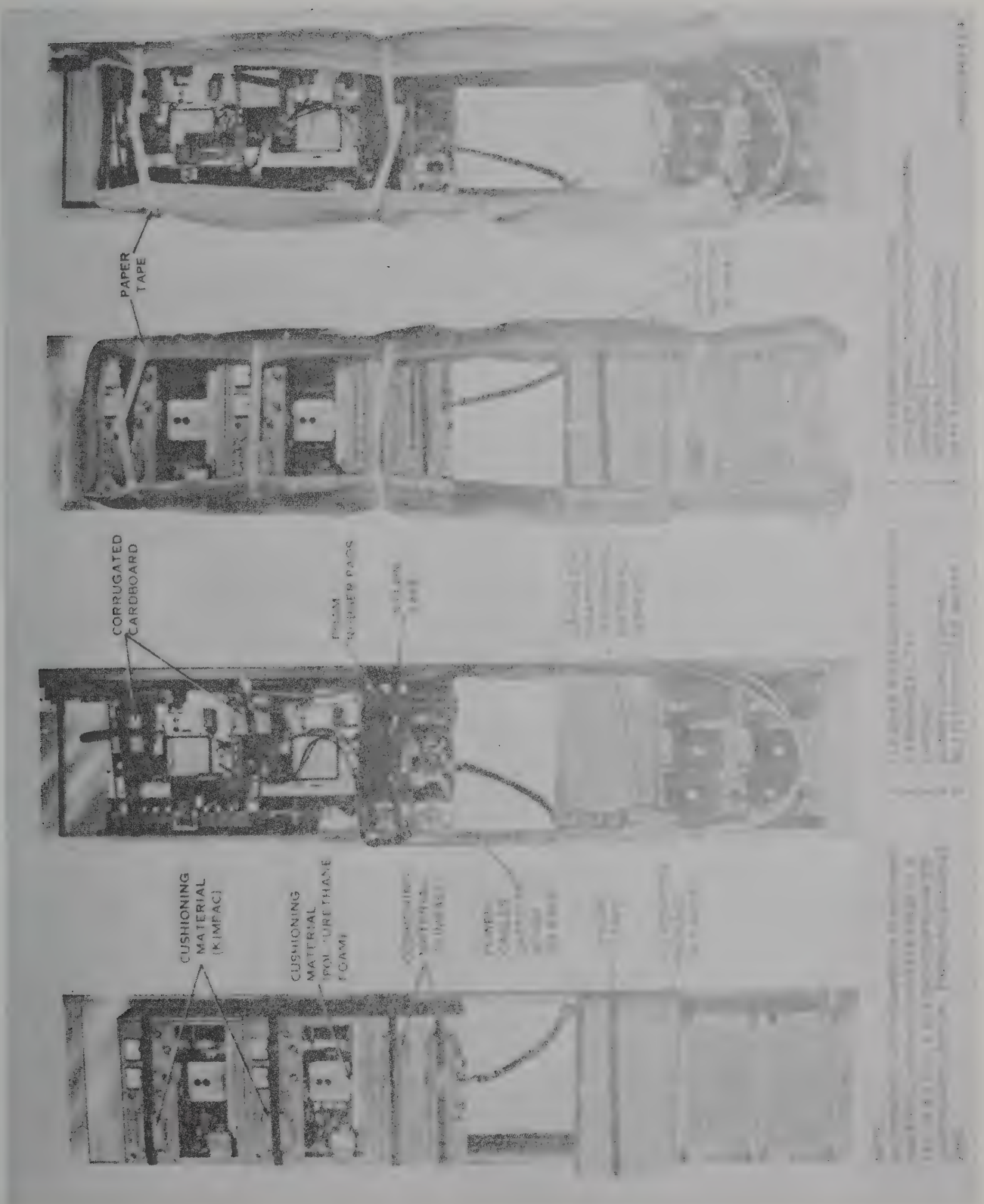


Figure 2-2. Equipment preparation for packaging (AN/FRC-80(V)1, 2).

f. Remove remainder of vapor barrier and top end inner protective plate.

g. Refer to figure 2-2 for AN/FRC-80(V)1 and AN/FRC-80(V)2. Remove accessories package and all cushioning and protective material and tape from the equipment. For AN/FRC-80(V)3, the accessories package is stored in the cabinet.

h. Open accessories package and power connectors package when the equipment is ready to be installed.

i. Use a hoist or other means available to suspend the equipment off the floor then remove wooden plate from the equipment rack bottom plate. Clean vapor sealant and material from the bottom plate. Clean residue from tape and packing material from the quipment.

2-9. Checking Unpacked Equipment

a. Inspect the equipment for damage that may have occurred during shipment. If the equipment has been damaged, fill out and forward DD Form 6.

b. Check to see that the equipment is complete as listed on the packing slip. The equipment should be placed in service even though a minor assembly or part that does not affect proper functioning is missing.

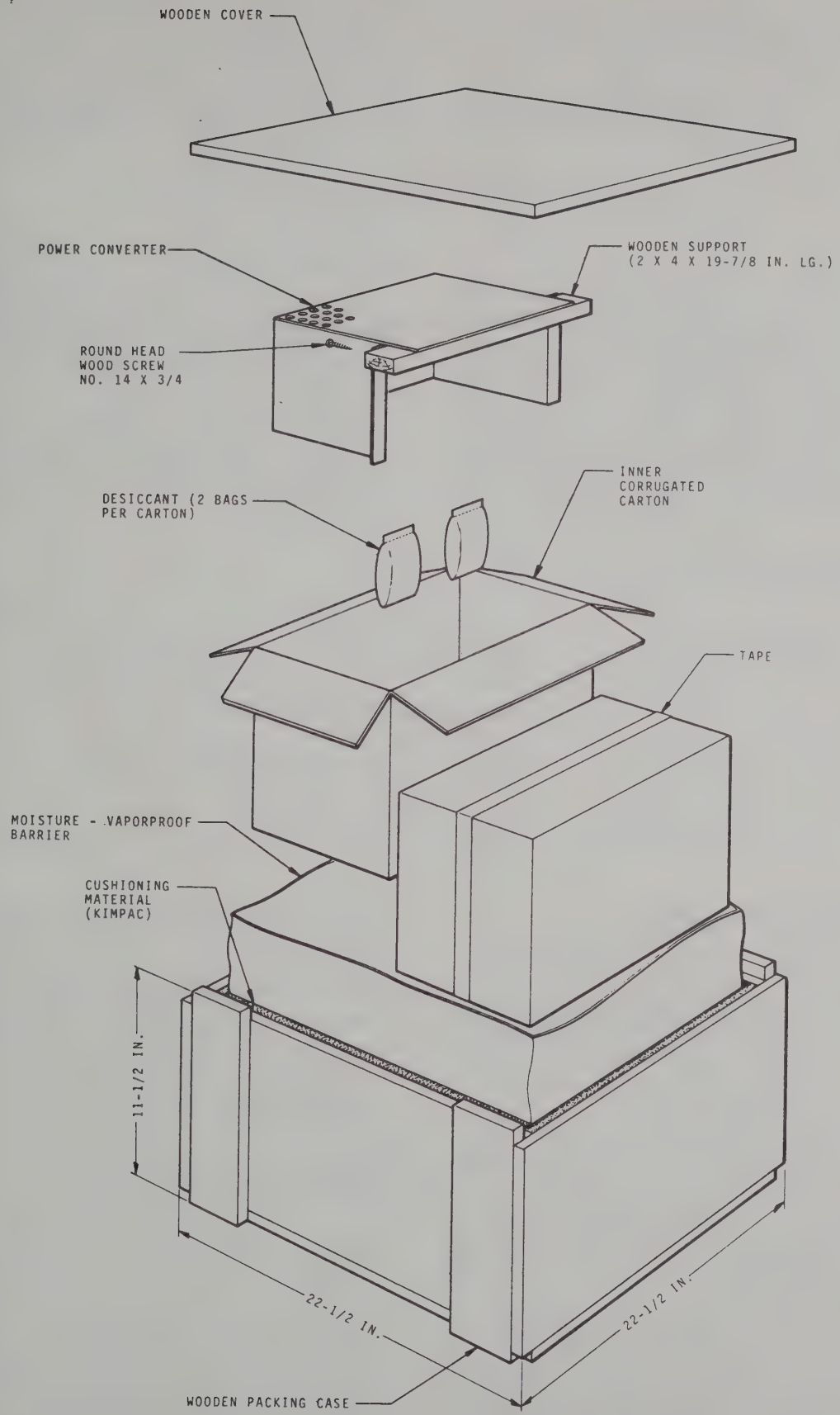


Figure 2-3. Power converter 1A2A2 and 1A5A2 packaging diagram.

NOTE

Current MWO's applicable to the equipment are listed in DA Pam 310–7.

d. Check the latest issue of DA PAM 310–4 (never more than one year old) and its latest changes (never more than six months old) to see whether you have the latest editions of all applicable maintenance literature. (Equipment issued by depots may have been in stock for sometime and may contain superseded manuals.)

Section III. INSTALLATION INSTRUCTIONS

2–10. General

This section provides installation instructions for the radio set. These instructions cover installation of the radio set only and provide general information for making connections to external equipment and antenna waveguide runs. The instructions provide typical procedures for installing the radio set in the configuration supplied at a typical site. The procedures may be modified when required by the installation plan or to cover special requirements of a specific site in which the radio set is to be installed. Dimensional data for the radio set is shown in figure 2–4 for AN/FRC–80(V)1 and AN/FRC–80(V)2, or figure 2–4.1 for AN/FRC–80(V)3.

NOTE

The following installation procedures must be performed by direct support and general support level maintenance personnel.

2–11. Tools, Test Equipment, and Materials

Item	*Purpose*	*Applicable publication*
Tool Kit, Electronic Equipment TK–105/G	General purpose	SC5180–91–CL–R07
Hoist, capable of lifting at least 750 pounds	To hoist the racked equipment onto mounting studs.	
6 capscrews, ½–13 × 1–1½ inch	Used to mount equipment rack to concrete or metal floors.	
6 lead anchors, ½–13 × 1-inch	Used to receive rack mounting screws in concrete floors.	
6 lag or toggle bolts, ½-inch diameter	Used to mount equipment rack to wood floors.	
6 flat washers, 1-inch OD by ⅝-inch ID by ⅛-inch.	Used under the head of capscrews or lag or toggle bolts.	

2–12. Installation Procedure

a. Rack or Cabinet Mounting. Mark the location of six mounting holes (for AN/FRC–80(V)1 and AN/FRC–80(V)2) or four mounting holes (for AN/FRC–80(V)3) required on the floor of the shelter (see figs. 2–4 and 2–4.1 for the dimensions between holes). If the shelter floor is concrete, install six 1/2–13 × 1-inch lead anchors. If the floor is metal, drill and tap six 1/2–13 holes. If the floor is wooden, drill six 1/2-inch holes. Move the rack into place and bolt to the floor using 1/2–13 × 1–1/2 inch cap screws (for concrete or metal floors) or 1/2-inch lag or toggle bolts (for wood floors). Use a 1/8-inch flat washer under the bolt head.

b. Power Converter Mounting. (figs. 2–5 and 2–5.1). Set one of the power converters on the floor at the rear of the rack. Connect plug 1A5A2P1, at the end of the short cable from the power converter, to jack 1A5A1J1 on the lower power supply chassis. Lift the power converter into position behind the lower power supply chassis and bolt to the two brackets with six sets of 10–32 × 5/8-inch screws, flat washers, lock washers and clinch nuts provided with the power converter. Connect 1A4P2 (the lowest of the two hanging connectors) from rt assembly (B) to 1A5A2J1 on the power converter. Rest the second power converter on top of the first and connect 1A2A2P1, at the end of the short cable from the power converter to 1A2A1J1 on the upper power supply chassis. Lift the power converter into position behind the upper power supply and bolt to the two brackets with the hardware provided. Connect 1A1P2 from rt assembly (A) to 1A2A2J1 on the upper power converter.

c. Rt Assembly Door Mounting. Check the attenuator calibration charts on the inside of the rt assembly doors and select the door marked Channel A. Hold the door at the bottom of the upper rt assembly with the calibration chart facing up and the two projecting tabs towards the equip-

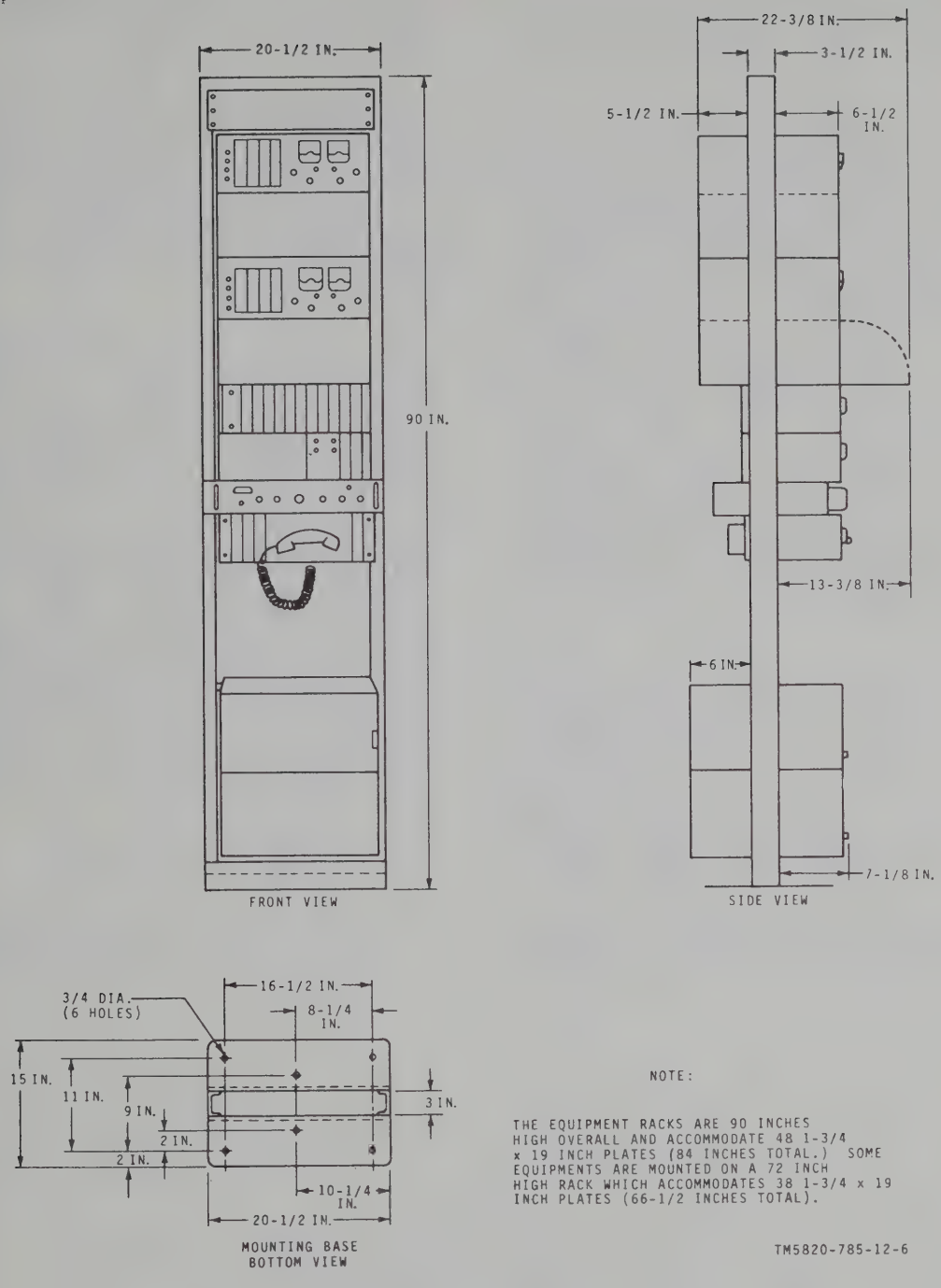


Figure 2-4. Equipment mounting dimension diagram (AN/FRC-80(V)1,2).

ment. Pivot the door to the upright position covering the front of the rt assembly. Mount the other door on the lower rt assembly in the same manner.

d. Power Connection Box and Rack Ground Strap Installation AN/FRC–80(V)1,2. Each corner at the upper rear of the rack has two tapped holes for mounting the power connection box. Normally the box is mounted in the upper left-hand corner at the rear of the rack. Use the two 8–32 × 5/8-inch screws provided to mount the power connection box. A tapped brass fitting is located at the lower right-hand corner of the rack for grounding the rack. If a suitable ground point is located within 24 inches of the rack, connect one end of the ground strap (provided) to the brass fitting with the 10–32 × 3/4-inch screw and connect the other end to the ground point. If no suitable ground point is so located, connect the brass fitting to the nearest earth ground using a copper bus.

e. Filter Mounting (AN/FRC–80(V)1,2) (fig. 2–6). Remove the tape from the end of harmonic 1FL4. Remove the tape from the top of circulator and connect the harmonic filter to the circulator with the filter section pointing upwards. Insert the eight 6–32 × 1/2-inch screws provided through the harmonic filter flange into the tapped holes in the circulator flange.

f. Vswr Monitor Coupling Device Installation (AN/FRC–80(V)1,2). Remove the tape from the end of harmonic filter 1FL4 and connect the vswr coupling device. Refer to TM 11–5805–570–15 for details on the vswr monitor.

f.1. Vswr Monitor Coupling Device Installation (AN/FRC–80(V)3 Only). Remove the tape from the receiver-transmitter waveguide feedthrough flange on the outside top of the rfi cabinet and connect the vswr coupling device to the flange. Refer to TM 11–5805–570–15 for details on the vswr monitor.

f.2. Flexible Waveguide Installation (AN/FRC–80(V)3 Only) (fig. 2–5.1). Remove the two flexible waveguide sections and their mounting hardware (in a cloth bag) from the accessories package. Open the rear door of the cabinet. Place the long section of flexible waveguide between circulator 1HY1 and the receiver-transmitter waveguide feedthrough flange. Secure the flexible waveguide to circulator 1HY1, using eight screws, and to the feedthrough flange, using four screws. Place the short section of flexible waveguide between receiver isolator 1AT1 and diversity receiver waveguide feedthrough flange. Secure the flexible waveguide to isolator 1AT1 using eight screws, and to the feedthrough flange, using four screws.

g. Flexible Waveguide Installation (AN/FRC–80(V)1,2). (fig. 2–6).

(1) The rigid waveguide installation must be completed before attaching the flexible wave-

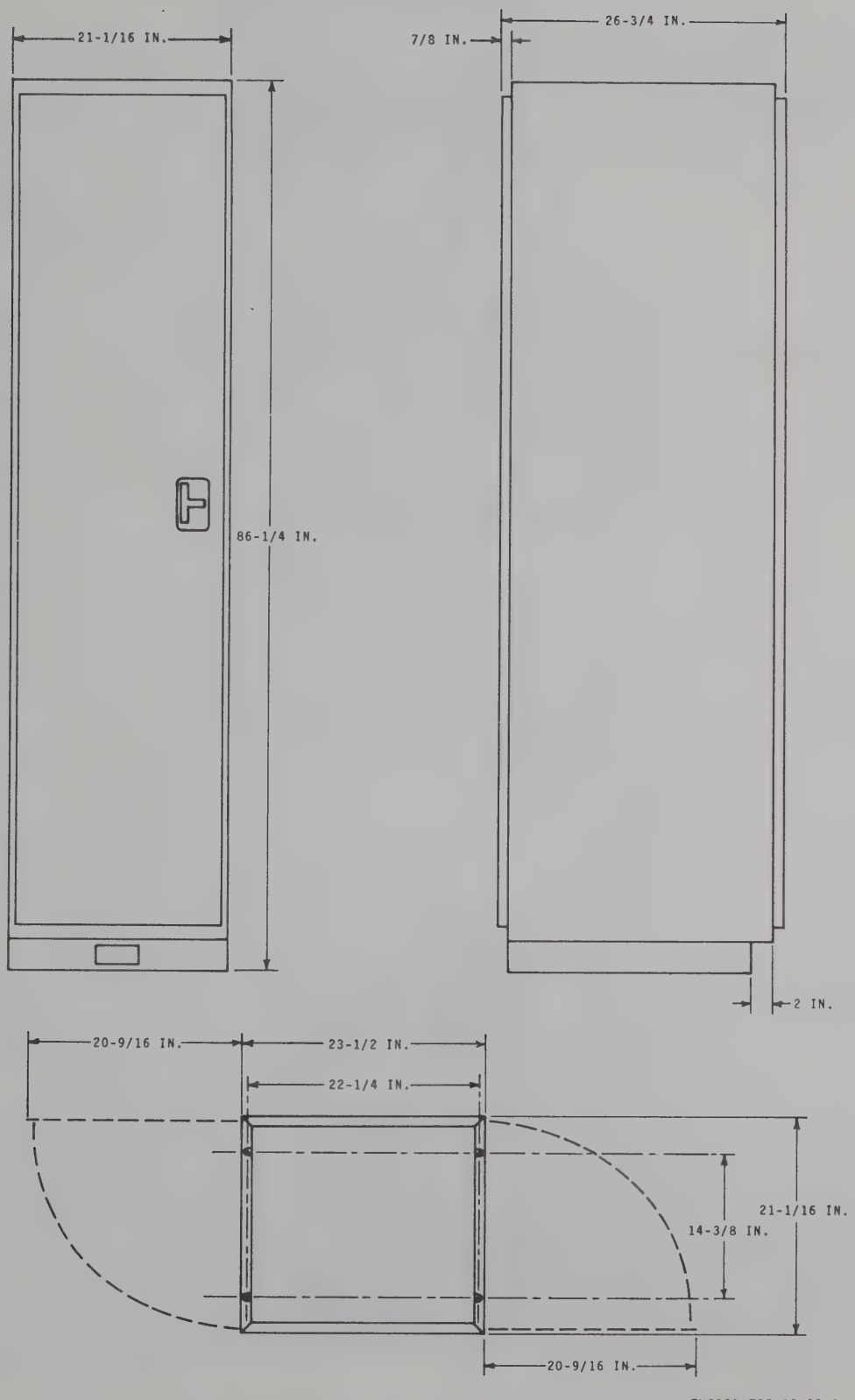


Figure 2–4.1. Equipment mounting dimension diagram (AN/FRC–80(V)3).

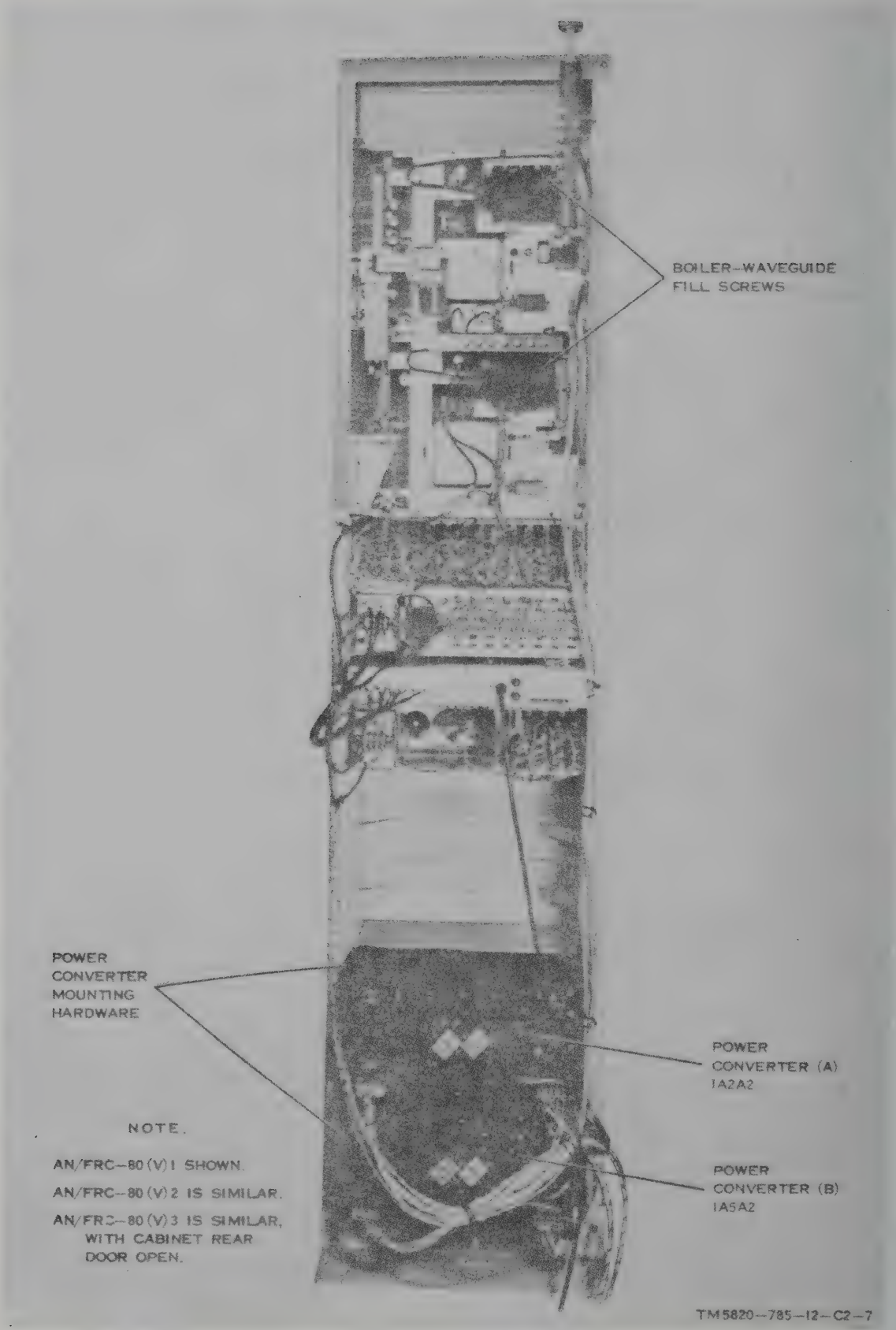


Figure 2-5. Power converter 1A2A2 and 1A5A2 mounting details.

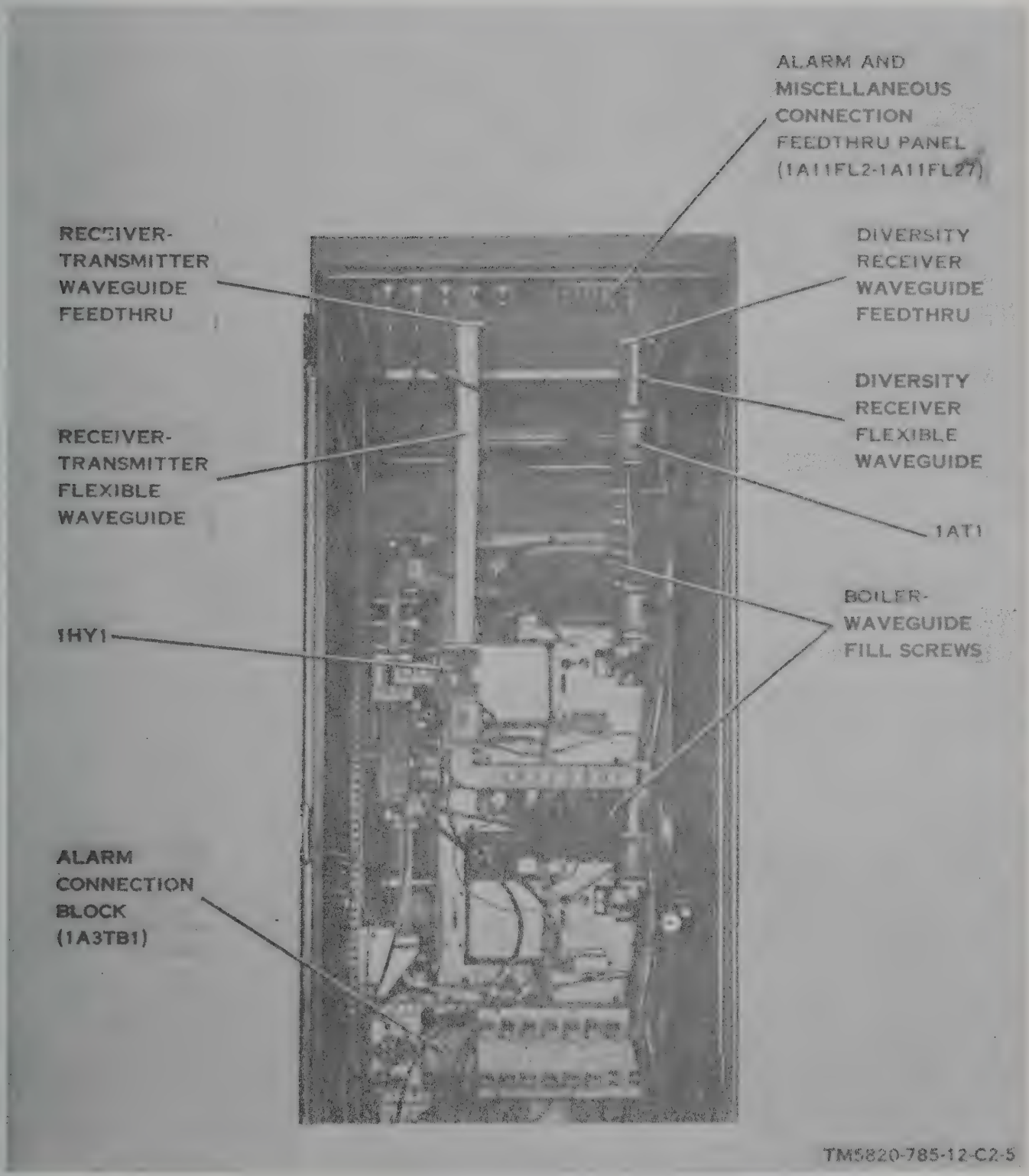


Figure 2–5.1. Flexible waveguide installation details (AN/FRC–80(V)3).

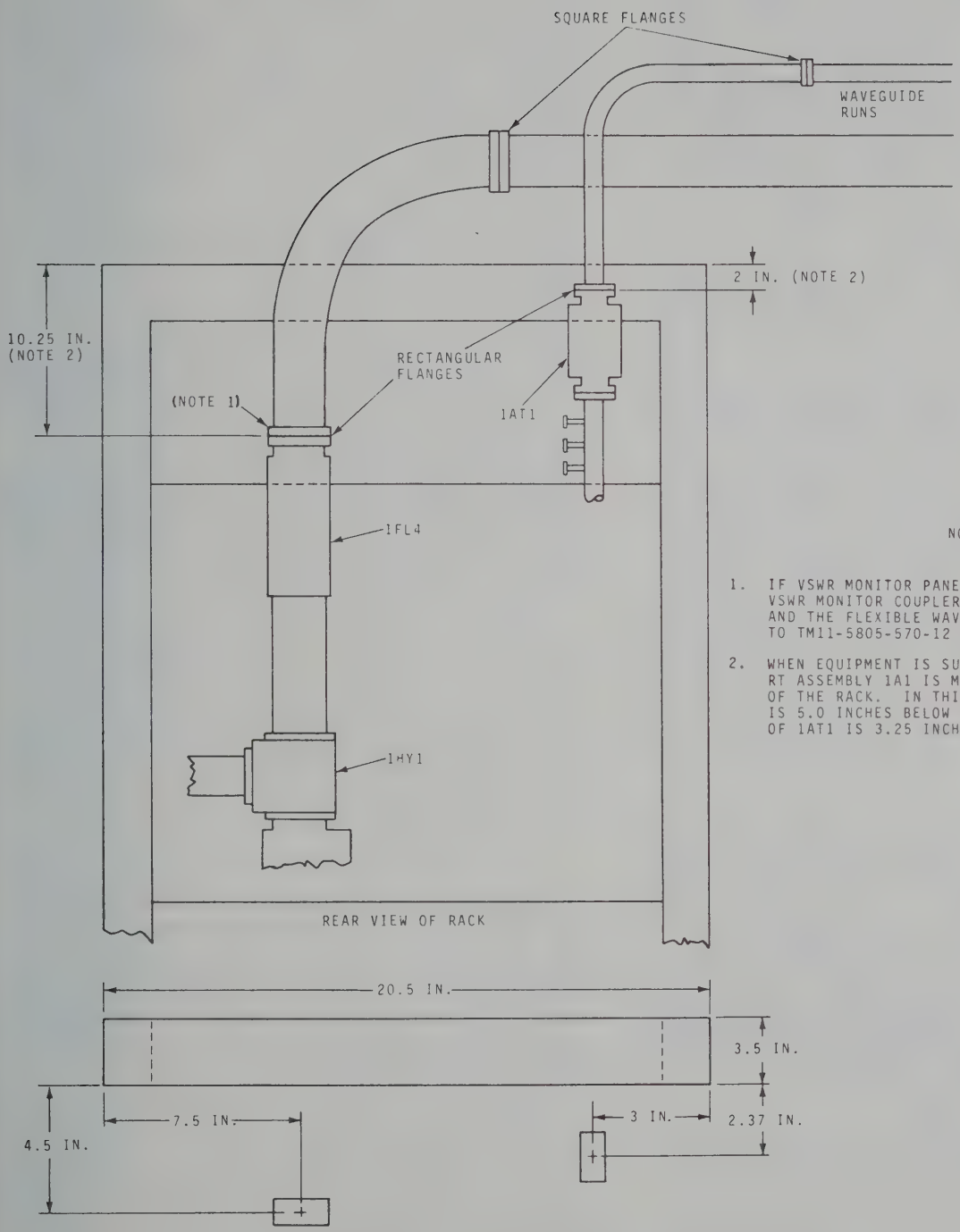


Figure 2-6. Location of antenna ports and typical waveguide connection details (AN/FRC-80(V)1,2.

guide to the equipment. The final flanges of the rigid waveguide run should be located close enough to the antenna ports on the equipment to allow connection using 24-inch sections of flexible waveguide without causing excessive side force against the rack wave-guide sections.

(2) Disconnect the shipping bracket and waveguide cover at the top of isolator 1AT1 from the rack by removing the two screws from the rack. Remove the cover from the isolator. Remove the covering from the rectangular flange of one of the 24-inch flexible waveguide sections and connect it to the isolator with the eight 6–32 × 1/2-inch screws, nuts, and lockwashers provided. Remove the covering from the square flange of the flexible waveguide and from one of the fixed waveguide runs. Connect the flexible waveguide to the fixed waveguide run using the four 8–32 × 5/8-inch screws, nuts and lockwashers provided.

(3) Remove any protective covering from the vswr monitor coupling device and attach the flexible waveguide section as specified in TM 11–5805–570–15. If the vswr monitor is not used, remove the protective covering from harmonic filter 1FL4. Remove the covering from the rectangular flange of the remaining piece of flexible waveguide and connect it to the filter with the eight 6–32 × 1/2-inch screws, nuts, and lockwashers provided. Remove the covering from the square flange of the flexible waveguide and from the remaining fixed waveguide runs. Connect the flexible waveguide to the fixed waveguide run using the four 8–32 × 5/8-inch screws, nuts, and lockwashers provided.

h. Klystron Coolant Filling. A syringe is provided for filling the boiler with distilled water. Fill both boilers as described in paragraph 4–9*b*.

i. Order Wire Terminations. Unused outputs of the order wire must be terminated in 75 ohms. Connect the two 75-ohm BNC terminations (1AT7 and 1AT8) provided to the unused BNC connectors 1A6J6 and 1A6J9 at the rear of the order wire (figs. 6–2, 6–3, and 6–4).

2–13. Power, Baseband, and Alarm Connections

(figs. 6–2, 6–3, and 6–4)

a. Rack Primary Power. Connect the primary power source to the two sets of rack power leads in the power connection box (usually mounted on the upper left-hand corner of the rear of the rack for AN/FRC–80(V)1, 2, or on the left hand corner of the rear of the rack for AN/FRC–80(V)3) using the three solderless connectors provided. Connect two white-brown-yellow wires to ac hot, the two white-green wires to ac neutral, and the two white wires to ground. If a 220V ac ±10% primary source is used, the connections to the primary of the power transformers in the converters must be changed. Remove the cover of power converter 1A2A2 and unsolder the white-black-green, black, brown, and green wires from terminals 2 through 5 of the transformer; then resolder the white-black-green wire to terminal 6, the black wire to terminal 7, the brown wire to terminal 9, and the green wire to terminal 10. Replace the cover and make the same modification to power converter 1A5A2. Replace the 4 ampere fuses on power supply assemblies 1A2 and 1A5 with 2 ampere fuses for operation from 220V ac primary power.

b. Power Connections to Order Wire and Combiner Bypass and Alarm Panel (AN/FRC–80(V)1 or Sensing and Control Shelf (AN/FRC–80(V)2 and AN/FRC–80(V)3). Seperate power connections must be made from the order wire and the combiner bypass and alarm panel or sensing and control shelf to the power converters. The power cables connect to these units and are run down the left rear side of the rack to the power converters.

(1) For AN/FRC–80(V)1, connect the cable pair (1W9) extending from the −24v (A) terminals on the combiner bypass and alarm panel to TB2 on power converter 1A2A2. Connect the gray wire (from + terminal 1A7TB2–2) to COM terminal 1A2A2TB2–1. Connect the white-gray wire (from − terminal 1A7TB2–1) to −25vdc terminal 1A2A2TB2–3.

(1.1) For AN/FRC–80(V)2, and 3, connect the cable pair (1W9) extending from the −24v (A) terminals on the sensing and control shelf to TB2 on power converter 1A2A2. Connect the gray wire (from + terminal 1A3TB2–2) to COM terminal 1A2A2TB2–1). Connect the white-gray wire (from −terminal 1A3TB2–1) to −25vdc terminal 1A2A2TB2–3.

(2) Connect cable pair (1W11) extending from the −24v (A) terminals on the order wire to TB2 on power converter 1A2A2. Connect the gray wire (from + terminal 1A6TB2–3) to COM terminal 1A2A2TB2–2. Connect the white-gray wire (from − terminal 1A6TB2–4) to −25vdc terminal 1A2A2TB–4.

(3) For AN/FRC–80(V)1, connect cable pair (1W10) extending from the −24v (B) terminals on the combiner bypass and alarm panel

to TB2 on power converter 1A5A2. Connect the gray wire (from + terminal 1A7TB2–4) to COM terminal 1A5A2TB2–2. Connect the white-gray wire (from − terminal 1A7TB2–3) to −25vdc terminal 1A5A2TB2–4.

(3.1) For AN/FRC–80(V)2, 3 connect cable pair (1W10) extending from the +24v (B) terminals on the sensing and control shelf to TB2 on power converter 1A5A2. Connect the gray wire (from + terminal 1A3TB2–4) to COM terminal 1A5A2TB2–2. Connect the white-gray wire (from − terminal 1A3TB2–3) to −25vdc terminal 1A5A2TB2–4.

(4) Connect cable pair (1W12) extending from the −24v (B) terminals on the order wire to TB2 on power converter 1A5A2. Connect the gray wire (from + terminal 1A6TB2–1) to COM terminal 1A5A2TB2–1. Connect the white-gray wire (from − terminal 1A6TB2–2) to −25vdc terminal 1A5A2TB2–3.

c. Baseband Connections. Baseband input and output connections to the external multiplex equipment are made with two 75-ohm coaxial cables with BNC connectors. The baseband input connection to the radio set is made to T connector 1CP2 on jack 1A4J1 at the back of the lower rt assembly on AN/FRC–80(V)1 and AN/FRC–80(V)2 or to jack 1A11J1 on the top of the equipment cabinet on AN/FRC–80(V)3. The baseband output connection from the radio set is made to 1A7J26 on the combiner bypass and alarm panel (AN/FRC–80(V)1) or 1A3J26 on the sensing and control shelf (AN/FRC–80(V)2, 1A11J2 on the top of the equipment cabinet (AN/FRC–80(V)3).

d. Alarm Connections (AN/FRC–80(V)1 Only. Dry form C contact outputs from the 13 fault conditions monitored by the radio set are available on a ten row by eight column terminal board 1A7TB1 at the rear of the combiner bypass and alarm panel. The terminals in columns A, B, and C are associated with rt assembly (A) 1A1 and the diversity combiner; column A provides the normally open contracts, column B, the common contacts, and column C the normally closed contacts. The terminals in columns F, G, and H are associated with rt assembly (B) 1A4, with column F providing the normally open contacts, column G providing common contacts, and column H providing normally closed. Refer to detail A, figure 6–2 for the functions of each set of contacts. Connections to the terminal board may be either wirewrapped or soldered. The wires should be brought in through the fanning strip at the left side of the terminal block.

d.1. Alarm Connections (AN/FRC–80(V)2 Only. Dry form C contact outputs from the 14 fault conditions monitored by the radio set are available on a ten-row by eight-column terminal board, 1A3TB1, at the rear of the sensing and control shelf. Connections to the terminal board may be either wire-wrapped or soldered. The wires should be brought in through the fanning strip at the left side of the terminal block. Refer to A, figure 6–3 for alarm connections to the terminal block.

d.2. Alarm Connections (AN/FRC–80(V)3 Only). Dry form C contact outputs from the 14 fault conditions monitored by the radio set are available on a ten-row by eight-column terminal board, 1A3TB1, at the rear of the sensing and control shelf. Connections must be made between the terminal board and feedthrough filters at the top of the rfi cabinet. There are 26 feedthrough filters, 1A11FL2 through 1A11FL27, available for the external alarm and other miscellaneous external connections. Use AWG No. 22 wire for alarm connections. Connections to the terminal board may be either wire wrapped or soldered. Connections to the filters should be soldered. Refer to details A and F of figure 6–4 for alarm connections.

2–14. Initial Checks and Adjustments After Installation

Two radio sets (terminals) at separate operating sites are required for a microwave link. Initial adjustments and tests required to optimize both radio sets of the microwave link are listed below with references to paragraphs in TM 11–5820–785–35 which contain the detailed procedures. The procedures must be performed by higher level maintenance on both sets in the link. Perform the system adjustment and test procedures in the sequence given below.

NOTE

The following system adjustments and tests must be made by direct support and general support maintenance personnel.

CAUTION

Be sure the boiler has been filled with distilled water (supplied) in accordance with paragraph 2–12*h* before energizing the radio set.

a. Receiver preselector 1FL1 and 1FL3 system alignment (para 9–6).

b. Transmitter tuning (para 8–8).

c. Receiver tuning (para 8–9).

d. Noise figure test (para 9–16).

e. Squelch receiver adjustment (para 8–12).

f. Modulation adjustments (para 8–10).

g. Minimum distortion adjustment (para 9–5).

h. Noise power ratio test (para 8–26).

i. Transmitter power test (para 8–23).

j. Overall frequency response test (para 8–25).

k. Pilot sensing adjustments (para 8–11).

l. Input level and output level test (para 8–24).

m. Transmitter rf switch operation test (para 8–21).

n. Transmitter frequency/power alarm test (para 8–22).

o. Order wire adjustments (para 8–13).

CHAPTER 3

OPERATION

WARNING

Before operating this equipment make certain that all requirements of TB SIG 291 are met. Injury or DEATH could result from improper or careless operation.

Section I. OPERATORS CONTROLS AND INSTRUMENTS

3–1. Damage From Improper Control Settings

Damage to the equipment cannot occur from improper control settings. However, the MODE control on the front panel of each rt assembly must remain set for maximum indication on 25–0–25 meters M2, with meter switches S4 set to the FREQ position. This setting assures that the klystron operating frequency is on the center of the power mode.

3–2. Operator's Controls, Indicators, and Connectors

a. Receiver-Transmitter 1A1 or 1A4 (fig. 3–1).

Control, indicator, or connector	*Function*
RCVR AFC S1 (toggle switch)	Turns afc control of receiver frequency on or off.
XMTR AFC S2 (toggle switch)	Turns afc control of transmitter frequency on or off.
Meter M2 (25 0–25 scale)	Indicates voltages and currents at various metering points as selected by meter selector switch S4.
S4 (meter selector switch, 10-position rotary)	Selects meter M2 connection for measurements in ten circuits:

Sw position	*Meter indication*
DISC	Receiver discriminator output.
REC LEV	Receiver i-f amplifier output.
VAR	Local oscillator varactor bias.
OSC	Receiver low frequency osc. current.
+24	+24 volt output of low voltage power supply.
−24	−24 volt output of low voltage power supply.
+12	+12 volt output of low voltage power supply.
−12	−12 volt output of low voltage power supply.
COMP	Checks receiver level comparator balance. Meter reads zero when A and B signals are equal (AN/FRC–80(V)2 and AN/FRC-80-(V)3). Not used in AN/FRC–80-(V)1, and meter always reads zero.
FREQ	Transmitter frequency at output of transmitter afc reference cavity. Preset to meter reading of 20 when transmitter is on frequency.

METER ADJ R41 (screwdriver adjustable potentiometer)	Adjust 25–0–25 meter M2 reading to 20 when transmitter is on frequency.
Meter M1 (0–10 scale)	Indicates voltages and currents as selected by S3 meter selector switch.
S3 (meter selector switch, 11-position rotary)	Selects meter M1 connections for measurements in nine circuits:

Sw position	*Meter indication*
SQ	Squelch receiver noise rectifier output.
MIX	Receiver mixer current.

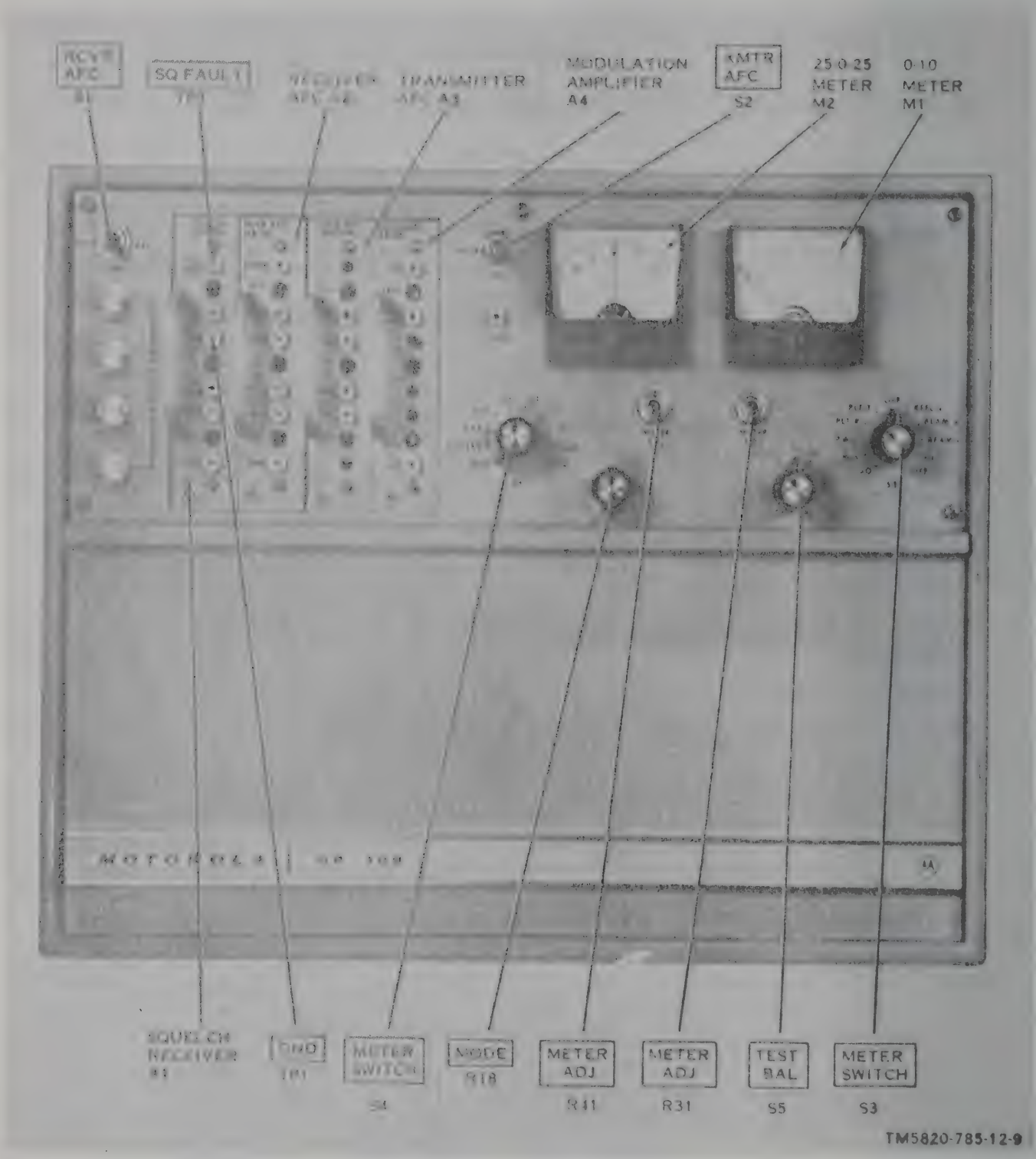


Figure 3–1. Receiver-transmitter 1A1 or 1A4, location of controls, indicators and connectors.

Control, indicator, or connector	*Function*
	Sw position / *Meter indication*: PWR — Transmitter klystron relative power output.
	PLT–R — Rectified output of receiver pilot receiver.
	PLT–T — Rectified output of transmitter pilot receiver.
	OFF — Two off positions are used to disconnect the meter from all circuits.
	REFL V — Klystron repeller voltage.
	BEAM V — Klystron beam voltage.
	BEAM I — Klystron cathode current.
	FIL — Klystron filament voltage.
METER ADJ R31 (screwdriver adjustable potentiometer)	Adjusts 0 10 meter M1 reading to 2.5 to indicate proper transmitter power output.
TEST BAL S5 (three-position rotary switch)	Changes klystron frequency mode for test purposes as follows:
	Sw position / *Function*: OFF — Klystron operates on frequency.
	+ — Increases klystron frequency approximately 20 MHz.
	– — Decreases klystron frequency approximately 20 MHz.
MODE R18 (potentiometer)	Adjust klystron operating point to center of power mode.
BASEBAND (monitor jacks):	
INPUT 1 J1	Monitor jack for baseband input from external multiple equipment.
INPUT 2 J2	Monitor jack for baseband input from order wire.
OUTPUT 1 J3	Monitor jack for receiver baseband output to combiner.
OUTPUT 2 J4	Monitor jack for receiver baseband output to order wire.
SQ FAULT A1TP3	Squelch fault test point.
GND A1TP1	Ground test point.

b. Sensing and Control Shelf Assembly 1A3 (AN/FRC–80(V)1 (fig. 3–2).

Control, indicator, or connector	*Function*
FAULT A1DS1 (red indicator lamp)	Indicates power frequency fault in transmitter (A).
RF SW FAULT A1DS2 (red indicator lamp)	Indicates RF switch fault in transmitter (A).
METER A2S1 (push-button)	Selects transmitter (A) pilot signal for metering on meter 1A1M1.
FAULT A2DS1 (red indicator lamp)	Indicates pilot fault in transmitter (A).
INPUT A2TP1 (test point)	Transmitter (A) pilot signal test point.
GND A2TP5 (test point)	Pilot receiver ground test point.
FAULT A3DS1 (red indicator lamp)	Indicates pilot fault in receiver (A).
METER A3S1 (push button switch)	Selects receiver (A) pilot signal for metering on meter 1A1M1.
METER A6S1 (push button switch)	Selects receiver (B) pilot signal for metering on meter 1A4M1.
FAULT A6DS1 (red indicator lamp)	Indicates pilot fault in receiver (B).
METER A7S1 (push-button switch)	Selects transmitter (B) pilot signal for metering on meter 1A4M1.
FAULT A7DS1 (red indicator lamp.	Indicates pilot fault in transmitter (B).
INPUT A7TP1 (test point)	Transmitter (B) pilot signal test point.
GND A7TP5 (test point)	Pilot receiver ground test point.
FAULT A8DS1 (red indicator lamp)	Indicates power or frequency fault in transmitter (B).
RF SW FAULT A8DS2 (red indicator lamp)	Indicates rf switch fault in transmitter (B).
CH A–AUTO–CH B A9S1 (toggle switch)	Manually selects either transmitter (A) or transmitter (B) RF output to be connected to the antenna.
A OP A9DS2 (green indicator lamp)	Indicates transmitter (A) RF output is connected to the antenna.
A A9TP2 (test point)	Bias test point for transmitter (A) RF switch.
B A9TP1 (test point)	Bias test point for transmitter (B) RF switch.
B OP A9DS1 (green indicator lamp)	Indicates transmitter (B) rf output is connected to the antenna.
GND A9TP3 (test point)	Ground test point for RF control.

c. Combiner Bypass and Alarm Panel 1A6 (AN/FRC–80(V)1) (fig. 3–3).

Control indicator, or connector	*Function*
RX A DS1 (green indicator lamp)	Indicates receiver (A) baseband is bypassing the diversity combiner.
RX B DS2 (green indicator .lamp)	Indicates receiver (B) baseband is bypassing the combiner.
COMB AMP DS3 (red indicator lamp)	Indicates diversity combiner amplifier fault.

Control, indicator, or connector	*Function*
COMB BYPASS DS4 (red indicator lamp)	Indicates diversity combiner is being bypassed.
MAN A–AUTO–MAN B (toggle switch)	MAN A: selects receiver (A) baseband for direct output, bypassing the diversity combiner. AUTO: selects combined baseband output of the diversity combiner. MAN B: selects receiver (B) baseband for direct output, bypassing the diversity combiner.
FAULT A1DS1 (red indicator lamp)	Indicates diversity combiner input one pilot fault.
METER A1S1 (pushbutton switch)	Selects diversity combiner input one pilot signal for metering on meter 1A1M1.
FAULT A2DS1 (red indicator lamp)	Indicates diversity combiner output pilot fault.
METER A2S1 (pushbutton switch)	Selects diversity combiner output pilot signal for metering on meters 1A1M1 and 1A4M1.
FAULT A3DS1 (red indicator lamp)	Indicates diversity combiner input two pilot fault.
METER A3S1 (pushbutton switch)	Selects diversity combiner input two pilot signal for metering on meter 1A4M1.

d. Diversity Combiner 1A8 (fig. 3–4).

Control or indicator	*Function*
ON–OFF S1 (toggle switch)	Turns diversity combiner primary power on or off.
Power DS1 (red indicator lamp)	Indicates primary power is applied to diversity combiner.

e. Order Wire 1A6 (fig. 3–5).

Control or indicator	*Function*
SPKR LEV A1R47 (potentiometer)	Volume control for loudspeaker LS1.
RING A3S1 (pushbutton switch)	Initiates ring tone signal for transmission over the link.
SIG A5DS1 (green indicator lamp)	Indicates a ring tone signal is being received.

f. Power Supply Assembly (fig. 3–6).

Control or indicator	*Function*
PWR S1 (toggle switch)	Turns power supply primary power on or off.
PWR DS1 (green indicator lamp)	Indicates primary power is applied to power supply.
HVDS2 (white indicator lamp)	Indicates high voltage supply is energized. Turns off when high voltage drops below 50 volts.

g. Sensing and Control Shelf Assembly 1A3 (AN/FRC–80(V)2) (fig. 3–2.1).

Control, indicator, or connector	*Function*
FAULT A1DSI (red indicator lamp).	Indicates power frequency fault in transmitter (A).
RF SW FAULT A1DS2 (red indicator lamp).	Indicates RF switch fault in transmitter (A).
METER A2S1 (pushbutton).	Selects transmitter (A) pilot signal for metering on meter 1A1M1.
FAULT A2DS1 (red indicator lamp).	Indicates pilot fault in transmitter (A).
INPUT A2TP1 (test point).	Transmitter (A) pilot signal test point.
GND A2TP5 (test point).	Pilot receiver ground test point.
FAULT A3DS1 (red indicator lamp).	Indicates pilot fault in receiver (A).
METER A3S1 (pushbutton switch).	Selects receiver (A) pilot signal for metering on meter 1A1M1.
CH OP A4DS1 (green incator lamp).	Indicates receiver (A) channel is operative.
LEV A4R4 (control)	Adjusts receiver (A) baseband level.
AUTO–OFF A4S1 (toggle switch).	In AUTO, permits automatic turnoff of faulty receiver (A). In OFF, channel (A) receiver is turned off.
CONT A4TP1 (test point).	Baseband control signal (A) test point.
CONT A4TP2 (test point).	+12V (A) test point.
CH OP A5DS1 (green indicator lamp).	Indicates receiver (B) channel is operative.
LEV A5R4 (cont)	Adjusts receiver (B) baseband level.
AUTO–OFF A5S1 (toggle switch).	In AUTO, permits automatic turnoff of faulty receiver (B). In OFF, channel (B) receiver is turned off.
CONT A5TP1 (test point).	Baseband control signal (B) test point.
CONT A5TP2 (test point).	+12V (B) test point.
METER A6S1 (pushbutton switch).	Selects receiver (B) pilot signal for metering on meter 1A4M1.
FAULT A6DS1 (red indicator lamp).	Indicates pilot fault in receiver (B).
METER A7S1 (pushbutton switch).	Selects transmitter (B) pilot signal for metering on meter 1A4M1.
FAULT A7DS1 (red indicator lamp).	Indicates pilot fault in transmitter (B).
INPUT A7TP1 (test point).	Transmitter (B) pilot signal test point.
GND A7TP4 (test point).	Pilot receiver ground test point.
FAULT A8DS1 (red indicator lamp).	Indicates power or frequency fault in transmitter (B).
RF SW FAULT A8DS2 (red indicator lamp).	Indicates rf switch fault in transmitter (B).
CH A–AUTO–CH B A9S1 (toggle switch).	Manually selects either transmitter (A) or transmitter (B) RF output to be connected to the antenna.
A OP A9DS2 (green indicator lamp).	Indicates transmitter (A) RF output is connected to the antenna.

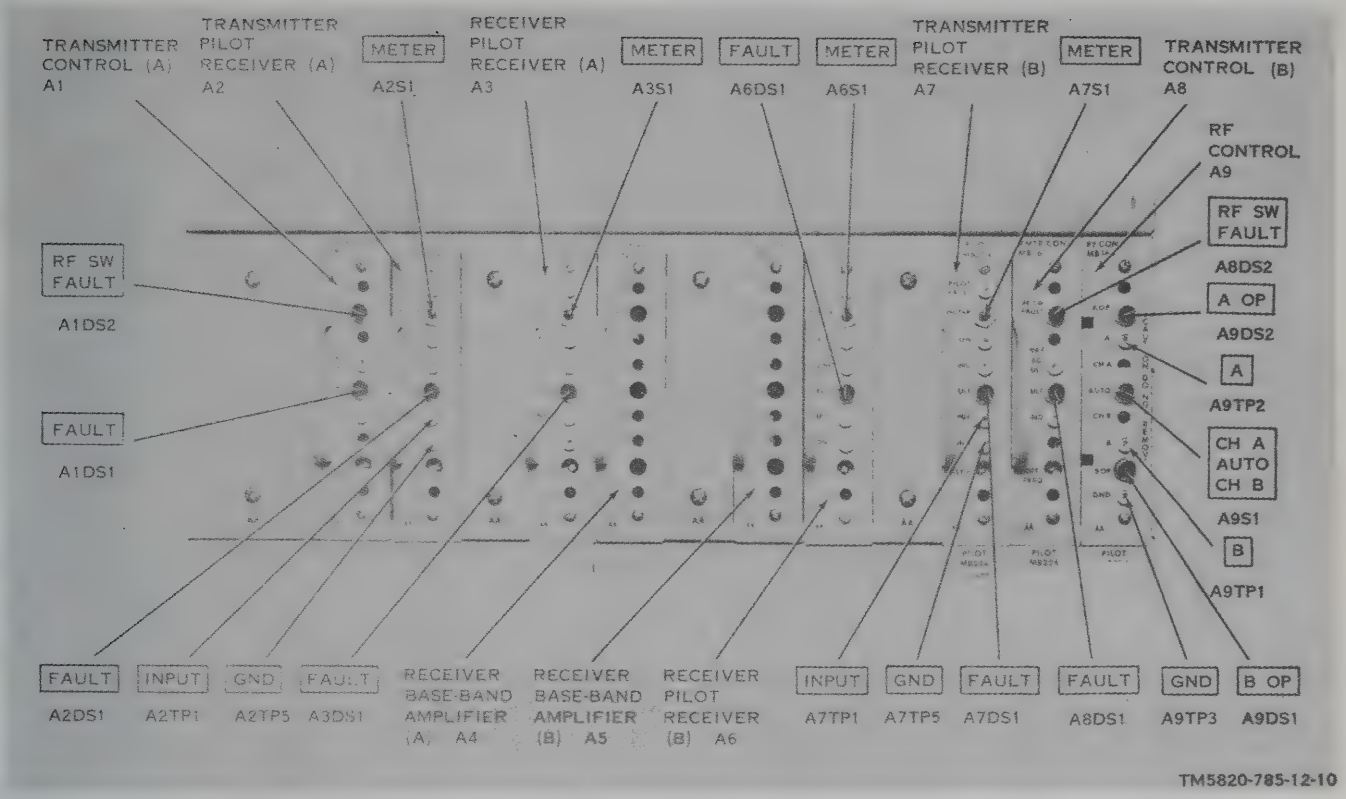


Figure 3-2. Sensing and control shelf 1A3, location of controls, indicators, and connectors.

Control, indicator, or connector	*Function*
A A9TP2 (test point)	Bias test point for transmitter (A) RF switch.
B A9TP1 (test point)	Bias test point for transmitter (B) RF switch.
B OP A9DS1 (green indicator lamp).	Indicates transmitter (B) RF output is connected to the
GND A9TP 3 (test point	Ground test point for RF control.
AUX B PWR FAULT A10DS1 (red indicator lamp).	Indicates Auxiliary power failure in (B) supply.
AUX A PWR FAULT A10DS2 (red indicator lamp).	Indicates auxiliary power failure in (A) supply.
MON 1 A11J1 (test jack)	Not used.
MON 2 A11J2 (test jack)	Combined baseband dc level check. check. Indicates condition of baseband switch diodes.
GND A11TP2 (test point).	Baseband switch ground test point.
SQ FAULT A12DS1 (red indic indicator lamp).	Indicates when receiver (B) is squelched.
GAIN A12R4 (control)	Adjusts receive level comparator (B) gain.
COMP BAL A12R11 (control).	Adjusts receive level comparator (B) balance.
REC LEV A12TP1 (test point).	Receives level (B) signal test point.

Control, indicator, or connector	*Function*
AMP BAL A A12TP2 (test point).	Test point for balancing receive level amplifier (B).
BIAS A12TP3 (test point).	Bias test point for receive level amplifier (B).
AMP BAL B A12TP4 (test point).	Test point for balancing receive level amplifier (B).
REC LEV FAULT A12-TP5 (test point).	Receives level fault (B) signal test point.
GND A12TP6 (test point).	Ground for receiver control (B).
B LEV FAULT A13DS1 (red indicator lamp).	Indicates when receiver (B) receive level fault is sensed.
A LEV FAULT A13DS2 (red indicator lamp).	Indicates when receiver (A) receive level fault is sensed.
SQ FAULT A14DS1 (red indicator lamp).	Indicates receiver (A) is squelched.
GAIN A14R4 (control)	Adjusts receive level comparator (A) gain.
COMP BAL A14R11 (control)	Adjusts receive level comparator (A) balance.
REC R LEV A14TP1 (test point).	Receiver level (A) signal test point.
AMP BAL A A14TP2 (test point).	Test point for balancing receive level amplifier (A).
REC LEV FAULT A14-TP5 (test point).	Receives level fault (A) signal test point.
GND A14TP6 (test point).	Ground for receiver control (A).

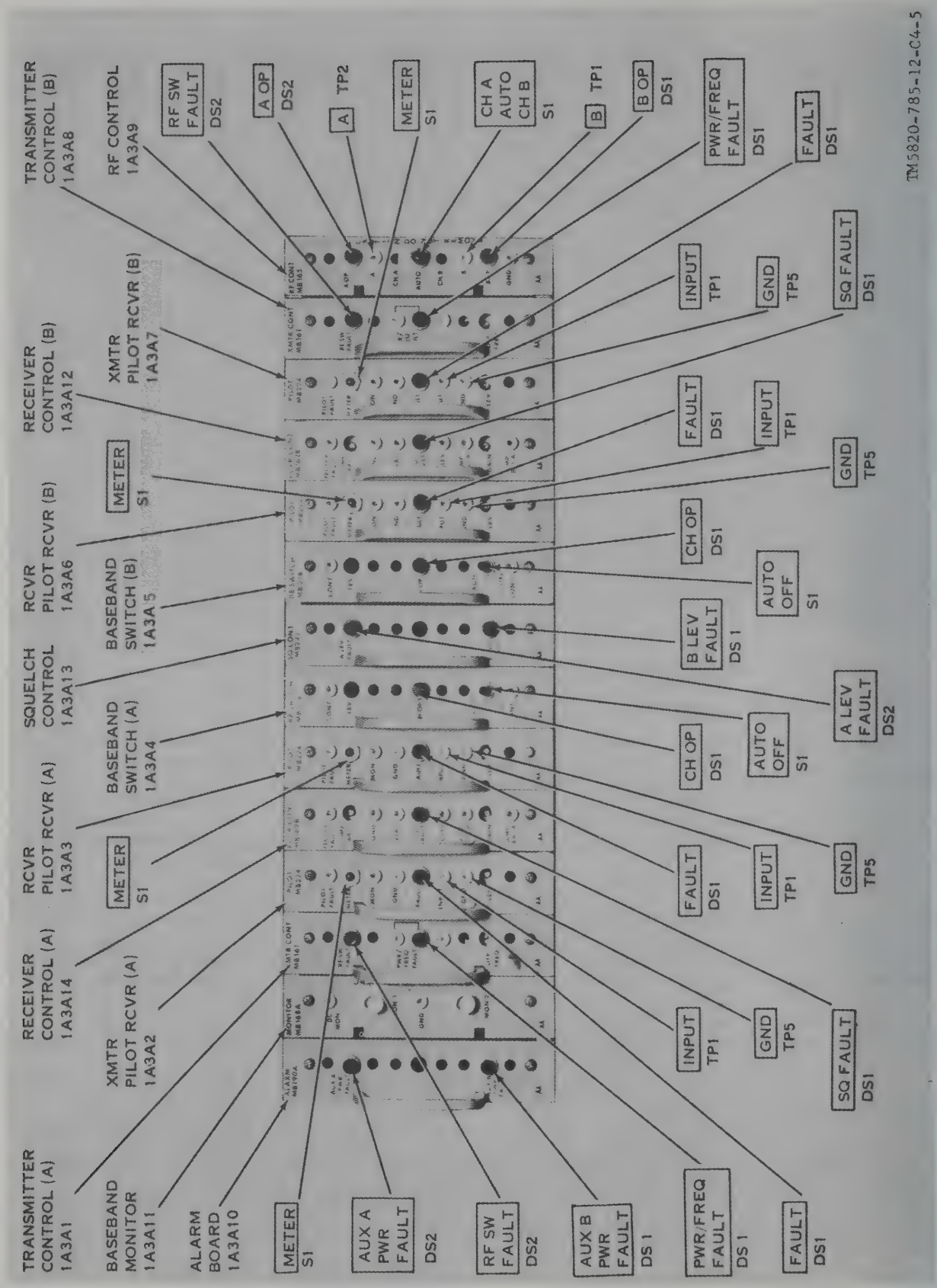


Figure 3-2.1. Sensing and control shelf, location of controls, indicators and connectors (AN/FRC-80(V)2, AN/FRC-80(V)3).

h. Pre-emphasis and De-emphasis Shelf Assembly 1A10 (AN/FRC–80(V)3 Only) (fig. 3–7).

Test Point	*Function*
MON A1TP1	Pre-emphasis amplifier (A) output signal test point.
GND A1TP2	Pre-emphasis amplifier (A) ground test point.
MON A2TP1	Pre-emphasis amplifier (B) output signal test point.
GND A2TP2	Pre-emphasis amplifier (B) ground test point.
MON A3TP1	De-emphasis amplifier (A) output signal test point.
GND A3TP2	De-emphasis amplifier (A) ground test point.
MON A4TP1	De-emphasis amplifier (B) output signal test point.
GND A4TP2	De-emphasis amplifier (B) ground test point.

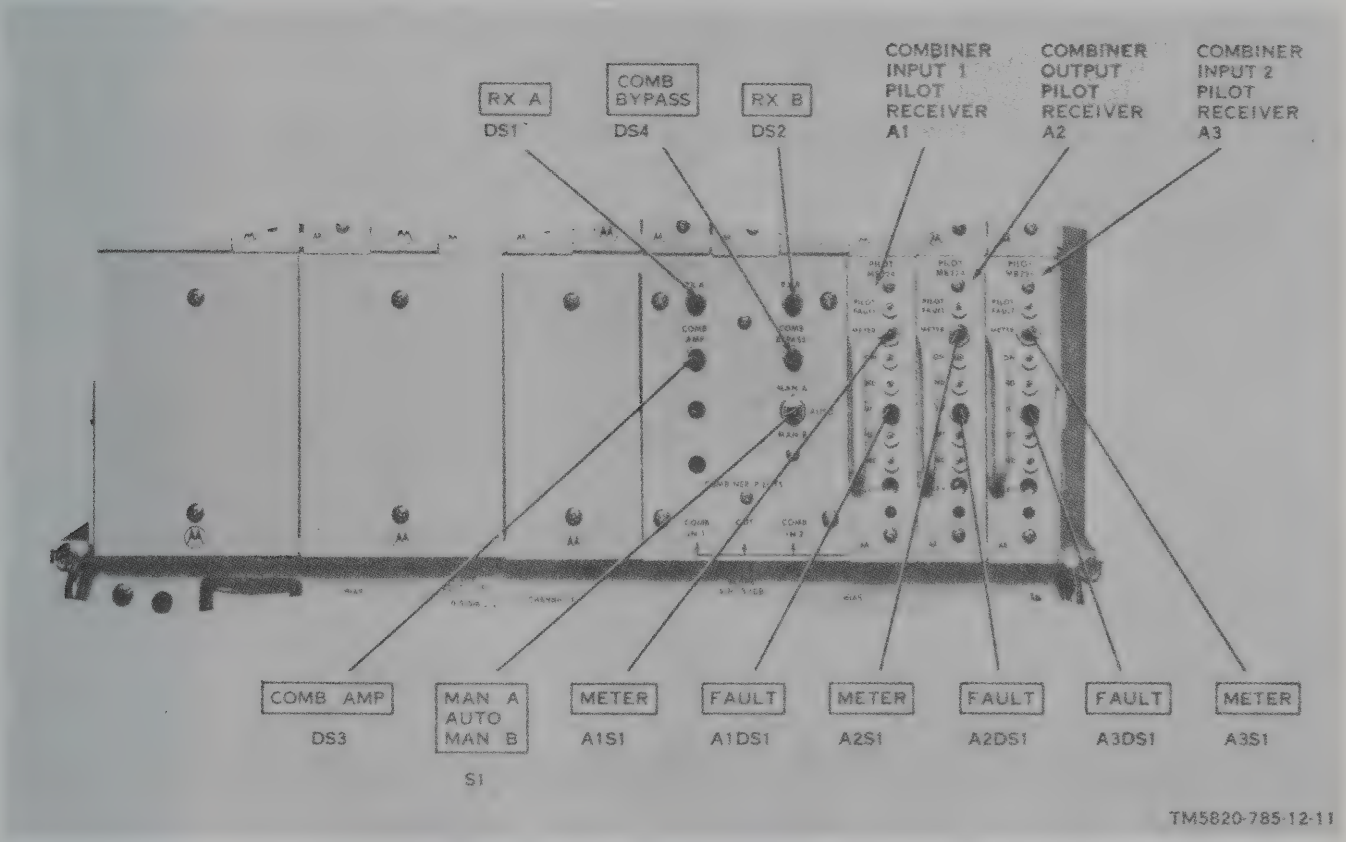


Figure 3–3. Combiner bypass and alarm panel 1A7, location of controls, indicators and connectors (AN/FRC–80(V)1).

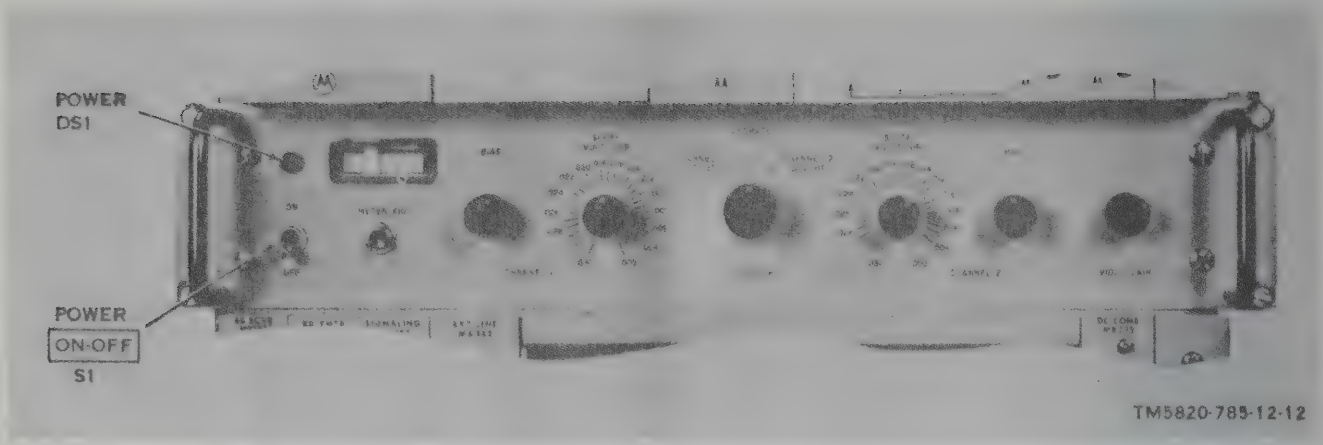


Figure 3–4. Diversity combiner 1A8, location of controls and indicators (AN/FRC–80(V)1).

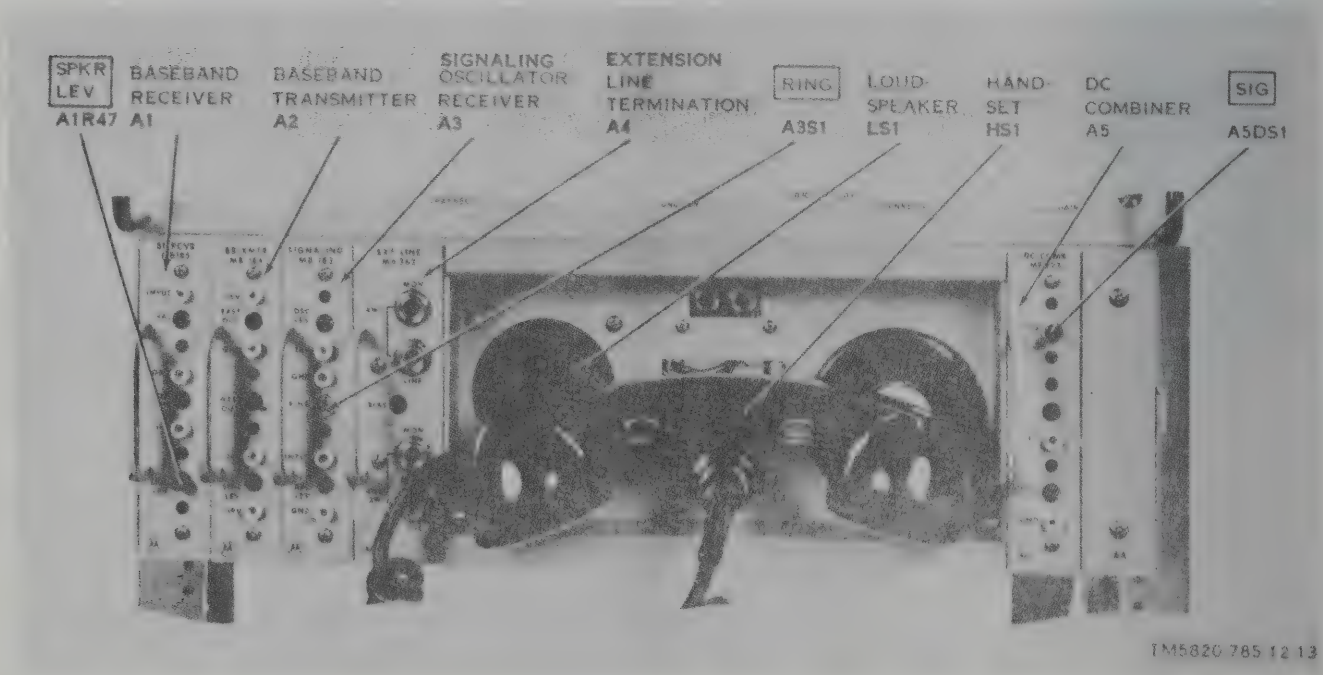


Figure 3–5. Order wire 1A6, location of controls, indicators, and connectors.

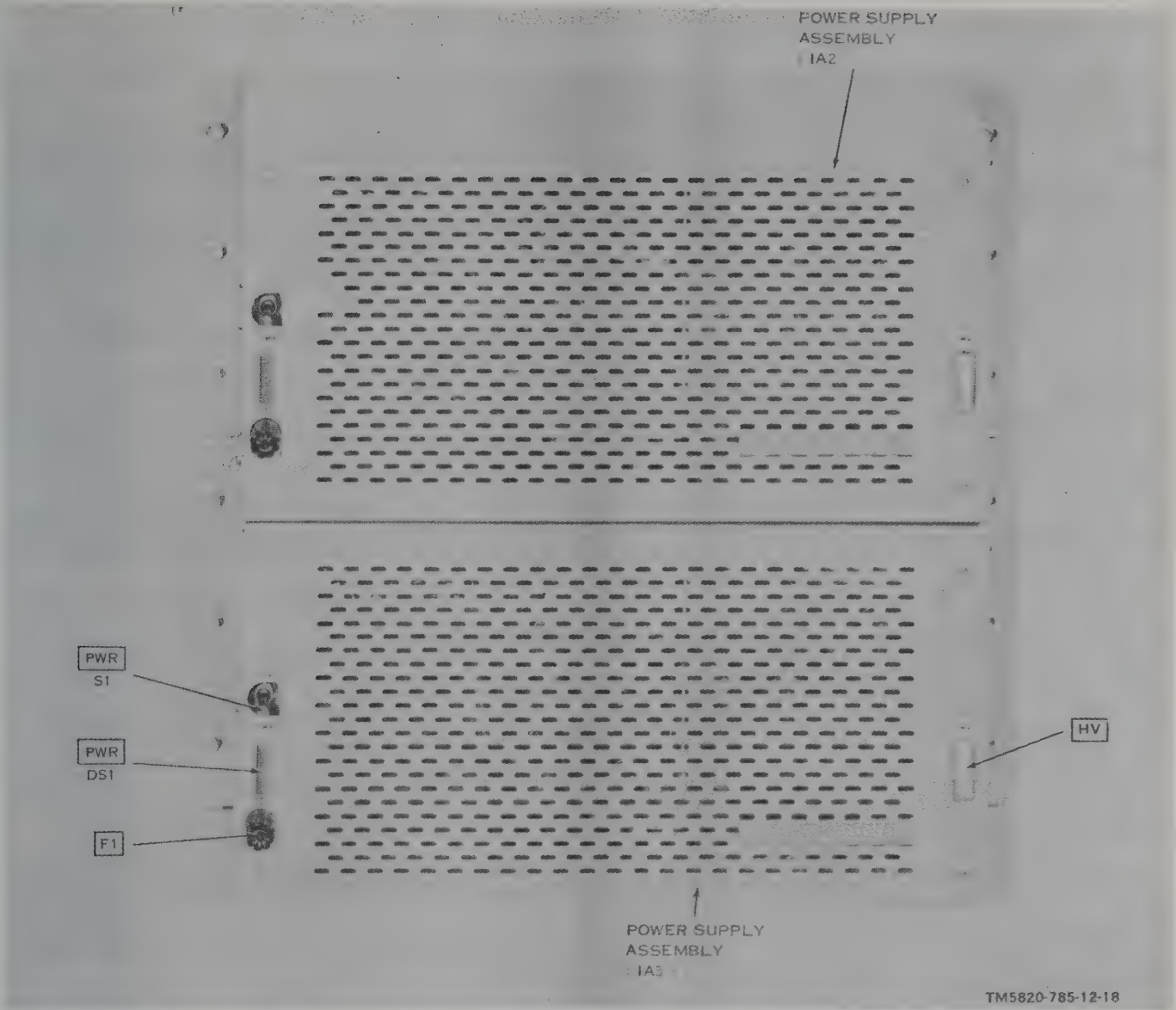


Figure 3-6. Power supply assembly 1A2 and 1A5, location of controls and indicators.

Section II. OPERATION

3-3. General

This section provides instructions for operating under normal conditions. The radio set is normally unattended during operation, therefore, the operating procedures consist of equipment turnon initial checks and adjustments, and equipment shutdown.

NOTE

In AN/FRC-80(V)3 only, the equipment is mounted in an rfi cabinet which has front and rear doors. Open the doors only when necessary to gain access to the equipment.

3-4. Preliminary Starting Procedure

a. Before turning on the radio set, see that the primary power source and the external multiplex and demultiplex equipments are properly connected.

b. Open the front cover on the lower half of each rt assembly and check the coolant level in both klystron ovens (fig. 4-1). The coolant level should be at the maximum mark scribed on the boiler chambers, or 3/4 of sight glass.

NOTE

It may be necessary to shine a flashlight through the sight glass port on the oven assembly to see the coolant level.

c. If the coolant level is low, add coolant fluid as described in paragraph 4-8*b*.

3-5. Operating Procedure

a. General. The operating procedure for the radio set consists of equipment turn-on, initial checks and adjustments, and an order wire operational check. Once the radio set is placed in operation, it operates unattended. The radio set receives its modulating signal (baseband) input from external multiplex equipment and provides a baseband output to external demultiplex (demodulating) equipment and therefore, does not require an operator.

b. Equipment Turn-On. To turn on the radio set, set the PWR switches on the two power supply assemblies (1A2 and 1A5) to ON and observe that the PWR and HV lamps light. For AN/FRC-80(V)1, also set the ON-OFF switch on the diversity combiner to ON and observe that the power indicator lamp lights.

c. Initial Checks and Adjustments. Perform the following initial checks and adjustments.

(1) On both rt assemblies, set the XMTR AFC switches to OFF, meter switches S4 to FREQ, and adjust MODE controls for maximum reading on the 25-0-25 meters (M2).

(2) Set XMTR AFC switches on both rt assemblies to on (up) position.

(3) Set meter switch S4 on both rt assemblies to the positions listed below and observe 25-0-25 meter M2 indications.

S4 switch position	*Typical normal indication*
DISC	0*
REV LEV	-15 to full scale
VAR	-4 to -12
OSC	-8 to -12
+24	+24
-24	-24
+12	+12
-12	-12
COMP	0
FREQ	+20

*If reading is not O, set REC AFC switch to OFF and adjust local oscillator for O meter indication, then set REC AFC switch to on (up position).

(4) Set meter switch S3 on both rt assemblies to the positions listed below and observe 0-10 meter M1 indications.

S3 switch position	*Typical normal indication*
SQ	0
MIX	2 to 4
PWR	4
REFL V	5.8
BEAM V	7.2
BEAM I	7.2
FIL	6.3

(5) Check that none of the fault indicator lamps are lit. Only the following indicator lamps should be lit.

(*a*) A OP or B OP on sensing and control shelf assembly.

(*b*) PWR on both power supply assemblies.

(*c*) HV on both power supply assemblies.

(*d*) Red power lamp on diversity combiner (AN/FRC-80(V)1).

(*e*) Both CH OP on sensing and control shelf assembly (AN/FRC-80(V)2).

d. Order Wire Operational Check. An operator or technician is required at each terminal of the link to perform this check. Make an operational check of the radio set using the order wire as follows:

(1) Lift the order wire handset from the cradle switch.

(2) Depress the RING switch on the signaling oscillator-receiver module. A ring tone should be heard at other terminal.

(3) Using the handset, conduct a conversation with the other terminal and note the quality of voice communications. Adjust SPKR LEV as required.

(4) Instruct the operator at the other terminal to ring you back and hang up the handset. When he rings back, observe that the SIG indicator lamp lights and the ring tone is heard through the speaker.

3-6. Equipment Shutdown

To shut down the equipment, set the PWR switches on the two power supply assemblies and, for AN/FRC-80(V)1, the ON-OFF switch on the diversity combiner to OFF.

Section III. OPERATION UNDER USUAL CONDITIONS

3–7. General

The radio set is normally installed in a building or other shelter facility and is not subject to great environmental changes or unusual conditions. However, the equipment could suffer a partial failure and still provide acceptable communications until a repair is made.

3–8. Operation With Partial Equipment Failure

The radio set contains two transmitters and two receivers with the receivers connected to separate antennas in a space diversity configuration. The two transmitters are connected to one antenna in a redundant configuration with automatic switchover when a transmitter failure occurs. A failure in one transmitter or one receiver may have no noticeable effect on communications except for a periodic fade in the received signal strength. However, if a failure should occur in both transmitters or both receivers at the same time, communications would be disrupted. Should this occur, it is possible that a fault exists in a plug-in module in both transmitter or both receiver signal paths. Substitution of identical modules between the two transmitters and receivers may restore communications until a repair can be made. Substitution of modules will upset system operating levels, however, normal system levels will have to be reset after the repair has been made. Substitute the identical modules one at a time until the faulty module is identified and communications are restored. Call higher level maintenance immediately to repair the equipment and inform them of the module substitution.

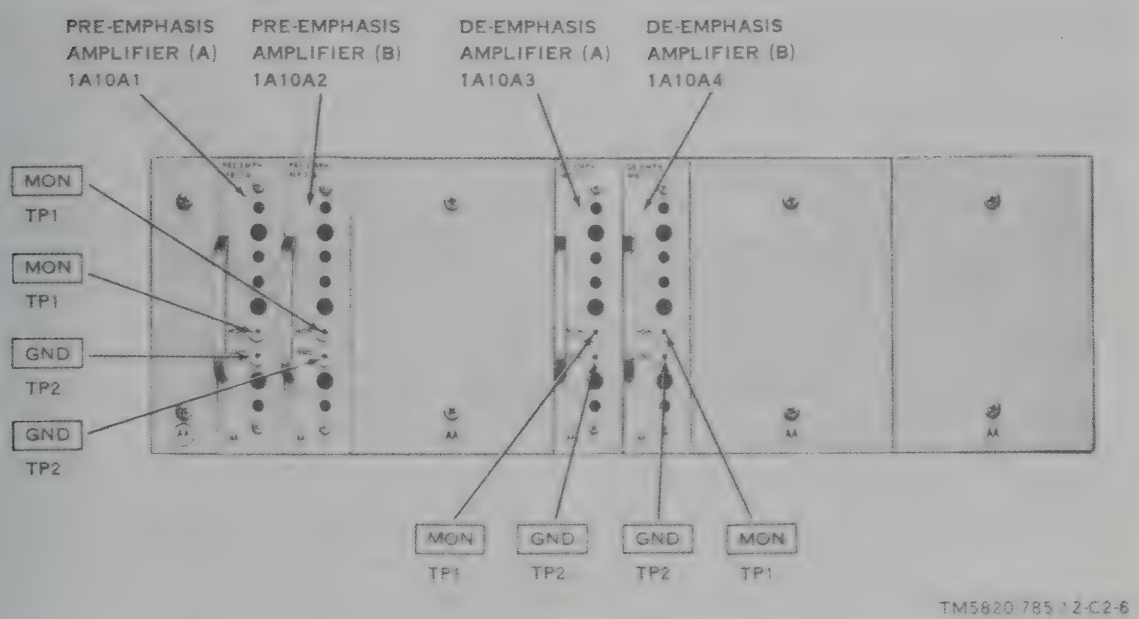


Figure 3–7. Pre-emphasis and de-emphasis shelf assembly 1A10, location of assemblies and test points (AN/FRC–80(V)3 only).

CHAPTER 4

ORGANIZATIONAL MAINTENANCE

Section I. GENERAL REQUIREMENTS

4-1. Scope of Organizational Maintenance

The duties assigned to organizational maintenance are limited by the tools and test equipment allocated. Following is a list of maintenance duties performed by organizational personnel as instructed in the referenced paragraphs:

a. Preventive maintenance (para 4-5 through 4-7).

b. Cleaning (para 4-8).

c. Vapor cooling system maintenance (para 4-9).

d. Troubleshooting (para 4-11 for AN/FRC-80(V)1 or para 4-16 for AN/FRC-80(V)2 and (V)3).

e. Switchover and alarm operation tests (para 4-12 for AN/FRC-80(V)1 or para 4-17 for AN/FRC-80(V)2).

f. Removal and replacement of plug-in relays (para 4-13 for AN/FRC-80(V)1 or para 4-18 for AN/FRC-80(V)2).

4-2. Tools, Test Equipment, and Materials Required

The tools, test equipment, and materials required by organizational maintenance are listed below. No special tools are required.

a. Tools. Tool Kit, Electronic Equipment TK-105/G.

b. Test Equipment. Multimeter AN/USM-210.

c. Materials.

(1) Cleaning compound (Federal Stock No. 7930-395-9542).

(2) Cheesecloth, bleached, lint-free.

(3) Sandpaper, No. 000.

(4) Small soft-bristled brush.

Section II. PREVENTIVE MAINTENANCE

4-3. General

Preventive maintenance is the systematic care, inspection, and servicing of equipment to maintain it in serviceable condition, prevent breakdowns, and assure maximum operational capability. Preventive maintenance is the responsibility of all echelons concerned with the equipment and includes the inspection, testing, and repair or replacement of parts, subassemblies, or units that inspection and tests indicate would probably fail before the next scheduled periodic service.

4-4. Preventive Maintenance Checks and Services Periods

a. Operator/organizational preventive maintenance checks and services (PMCS) of the radio set are performed at daily and monthly intervals while higher level preventive maintenance checks and services are performed at 6-month intervals by higher level maintenance. These recommended schedules should be observed unless otherwise directed by the commanding officer.

b. An equipment log should be kept for recording meter readings and equipment conditions noted during performance of the procedures. A comparison of these readings over a period of time may indicate a gradual deterioration of performance which might indicate the need for corrective maintenance. Conversely, the comparison of the readings may indicate that some of the preventive maintenance checks should be made at longer intervals. For instance, daily recording of the REC LEV meter reading may indicate a gradual decrease in received signal level. If this trend continues, it indicates that corrective measures should be taken before communications are

disrupted. The same is true for the transmitter PWR meter reading.

4–5. Daily Preventive Maintenance Checks and Services

The chart below specifies the maintenance checks and services that are to be performed daily. Records and reports of these checks and services must be made in accordance with the requirements set forth in TM 38–750.

NOTE

If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation; make the complete checks and services when the equipment may be shut down.

Sequence No.	*Item*	*Procedure*	*References*
1	Exterior of equipment	Check general conditions of the equipment rack, component housing, and front panels.	None.
2	Cabling, connectors, and wiring.	Check all exterior cables and wiring harnesses for breaks, cuts, deterioration, strain, and fraying. Check for proper connections.	(Figs. 6–2, 6–3, 6–4).
3	Front panel meter readings	Set meter switch S3 on each rt assembly to REC LEV and meter switch S4 to PWR. Record received signal level (REC LEV) indicated on 25–0–25 meter M2 and transmitter output power (PWR) indicated on 0–10 meter M1. Compare these readings with previous daily checks to see if they have changed significantly, indicating the need for possible corrective action by higher level maintenance.	None.
4	Operational check	Check that the PWR and HV lamps on both power supplies are lit and the power on indicator lamp on the diversity combiner is lit. Check that no fault indicator lamps are lit. Perform operational check using the order wire.	Paragraph 3–5*d*.

4–6. Monthly Preventive Maintenance Checks and Services

Monthly maintenance checks and services on the radio set are required in addition to the daily checks. The daily checks and services (para 4–5) constitute a part of the monthly maintenance and must be performed concurrently. Record all deficiencies or shortcomings in accordance with the requirements of TM 38–750.

NOTE

If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation; make the complete checks and services when the equipment may be shut down.

Sequence No.	Item	Procedure	References
1	Exterior surfaces	Clean exterior surfaces of rack, component housings, and front panels.	Paragraph 4-8*a*.
2	Vapor cooling system	Check vapor cooling system for signs of leakage and check coolant level.	Paragraph 4-9.
3	Front panel meter readings	Check and record front panel meter readings for all positions of meter switches S3 and S4 on both rt assemblies. Record klystron beam current on BEAM I position of meter switch S3. Compare reading with readings previously recorded. Radical change in BEAM I readings indicates higher category of maintenance required.	Paragraphs 3-5*c* (3) and (4).

4-7. Semiannual Preventive Maintenance Checks and Services

Except for one procedure (boiler-waveguide sight glass cleaning, para 4-8*b*) semiannual (6-month interval) preventive maintenance checks and services must be performed by higher level

maintenance. Cleaning of the boiler-waveguide sight glass should be performed by organizational maintenance when the equipment is shut down for the 6-month PMCS. The list of procedures to be performed at 6-month intervals are provided below to complete the scope of preventive maintenance required on the radio set. A scheduled "downtime" for maintenance procedures should be performed at 6-month intervals. Referenced paragraphs are contained in TM 11-5820-785-35 unless otherwise indicated.

a. Receiver sensitivity (para 8-28).
b. Transmitter frequency (para 8-29).
c. Transmitter power (para 8-23).
d. Noise power ratio (para 8-26).
e. Frequency response (para 8-25).
f. Input level and output level (para 8-24).
g. Boiler-waveguide sight glass cleaning (para 4-8*b* in this technical manual).

NOTE

Later models using the push-in (not the screw-in) type of sight glass have windows that are subject to deterioration. For replacement, order the following as required: Window, Boiler NSN 5820-00-115-1024 Gasket, "O"-ring NSN 5330-00-123-8800 Extractor, Window NSN 5820-00-115-1061

4-8. Cleaning

a. Exterior Surfaces. Inspect the exteriors of all components in the equipment rack. The exterior surfaces should be kept clean, and free of dust, dirt, grease, and fungus.

(1) Remove dust and loose dirt with a clean soft cloth.

WARNING

Prolonged breathing of cleaning compound is dangerous; provide adequate ventilation; cleaning compound is flammable; do not use near open flame.

(2) Remove grease, fungus, and ground-in dirt from external surfaces; use a cloth dampened (not wet) with cleaning compound (Federal Stock No. 7930-395-9542).

(3) Remove dust and dirt from plugs, jacks, wiring harnesses, and cables using a soft bristled brush.

(4) Clean front panel meters and control knobs using a soft clean cloth. If dirt is difficult to remove dampen the cloth with water; use mild soap, if necessary.

(5) Clean rust and corosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of paint on the sanded area to protect it from further corrosion. Refer to the applicable refinishing practices specified in TM 9-213.

b. Boiler-Waveguide Sight Glass Cleaning. (fig. 4-1 and 4-2) This procedure can only be performed when the radio set is shut down for maintenance. Wait for the boiler-waveguide to cool before removing the sight glass. The klystron oven assembly front cover should be removed after the equipment has been deenergized to speed up the cooling.

WARNING

High voltages dangerous to life are present on the klystron and thermal fuse in the klystron oven assembly. Be absolutely sure the equipment is completely deenergized and the HV lamps on both power supply assemblies have been extinguished before starting this procedure.

(1) Set PWR switches on both power supply assemblies to OFF and check that both lamps extinguish.

(2) Open the rt assembly compartment cover and remove the klystron oven assembly front cover by loosening the two Phillips-head screws.

(3) Place absorbent material on the top of the i-f amplifier to retain the water that will drain from the boiler.

WARNING

Wait until the boiler-waveguide has cooled before removing sight glass.

(4) On early models, remove sight glass by unscrewing it from the boiler. On later models, use special tool to grasp edges of sight glass and pull it straight out.

(5) Wipe any foreign material from the sight glass with a soft clean cloth.

(6) Check the condition of the sight glass **O**-ring and replace it if necessary.

(7) Replace the sight glass by screwing it firmly to the boiler or pushing it into the opening on the boiler.

(8) Remove the absorbent material from the i-f amplifier and wipe up any remaining water.

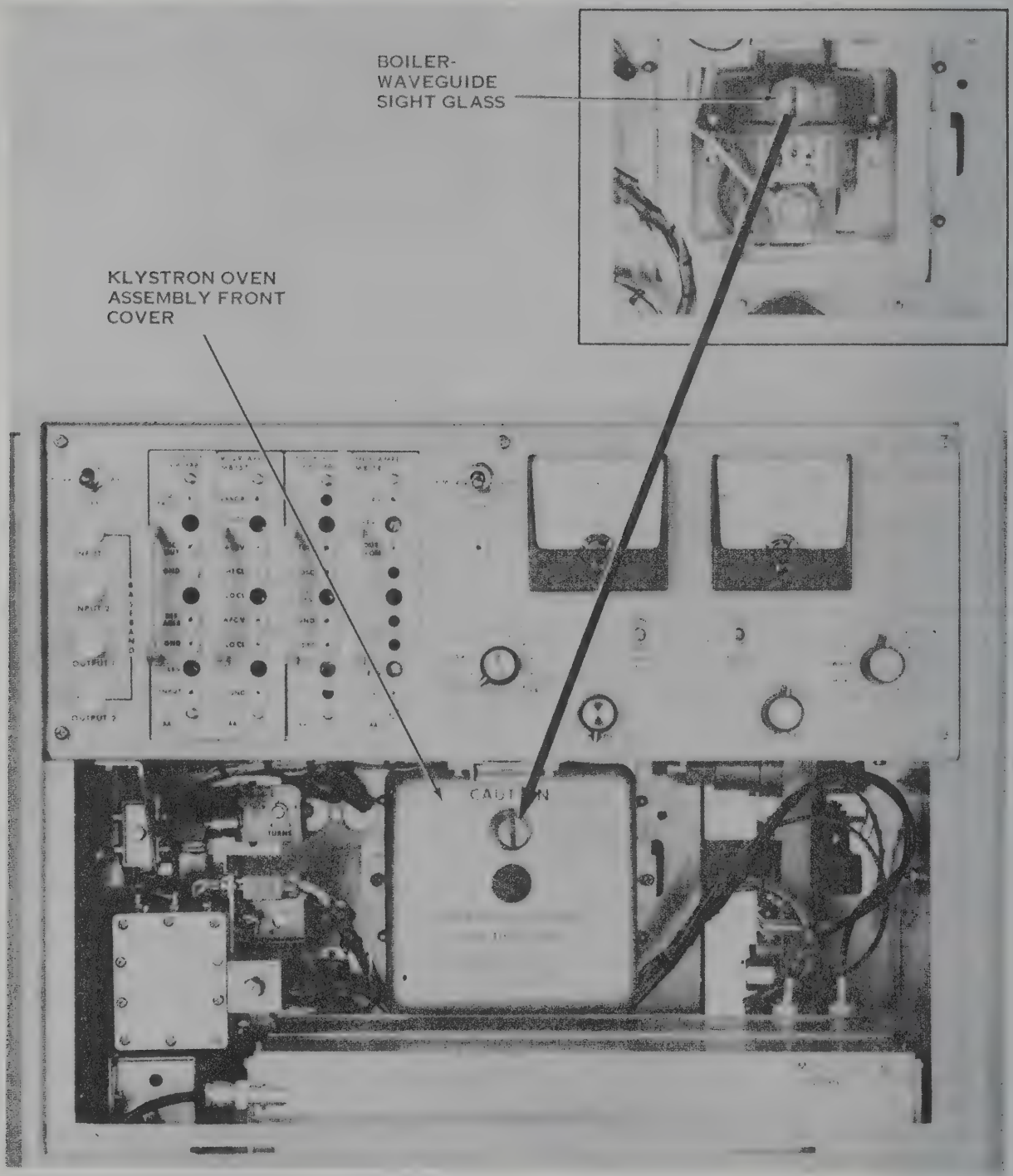
(9) Refill the boiler with distilled water, following the procedure in paragraph 4-9*b*. Check for any leaks.

(10) Reinstall the klystron oven assembly front cover.

4-9. Vapor Cooling System Maintenance

a. Determining Normal Evaporation Rate.

(1) To determine the normal evaporation rate, it is suggested that the water level for each rt assembly be checked monthly for at least the



TM5820-785-12-15

Figure 4-1. Rt assembly 1A1 or 1A4, front view, location of boiler-waveguide sight glass.

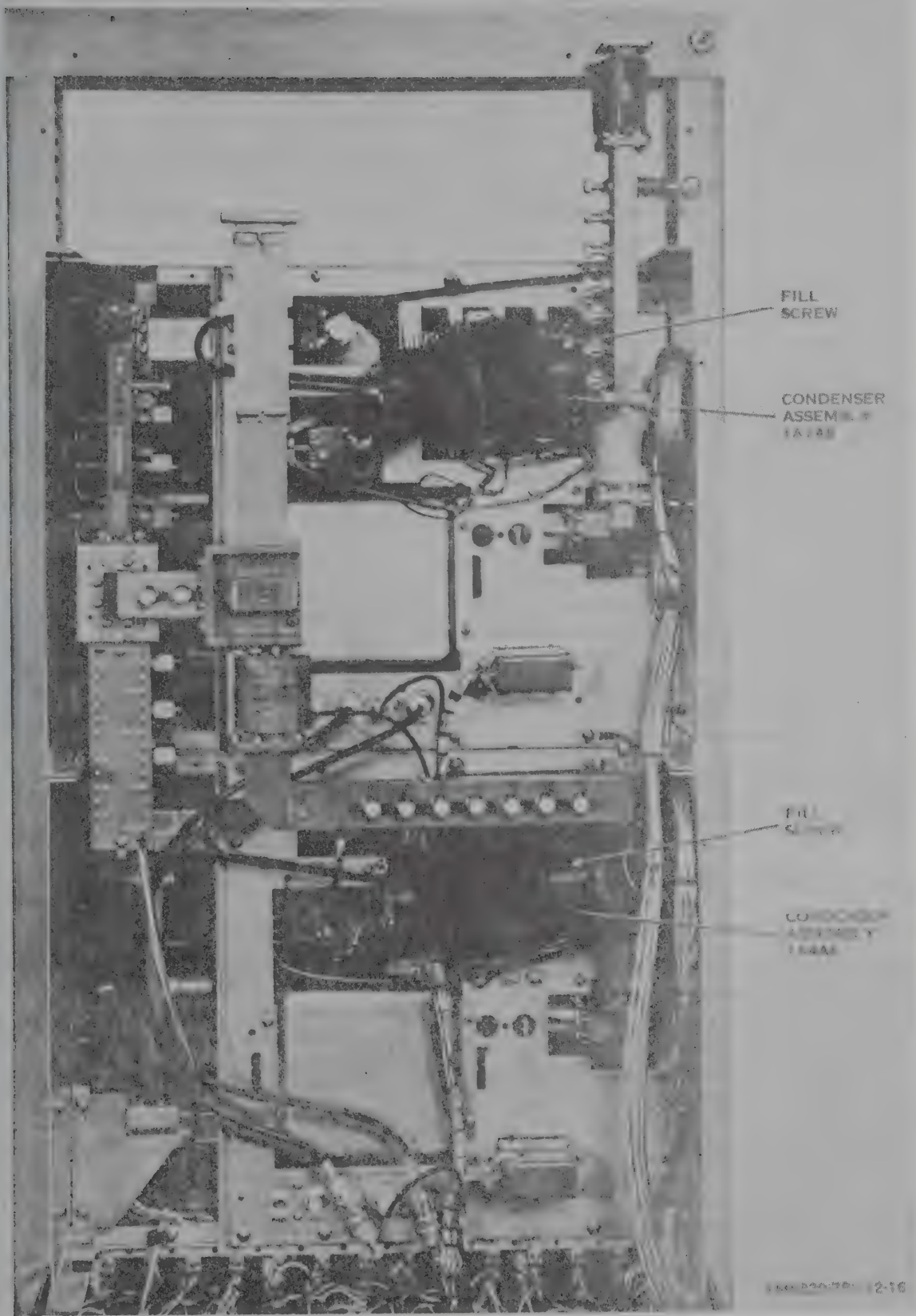


Figure 4–2. Rt assemblies 1A1 and 1A4, location of fill screws.

first six months of operation. A record should be maintained indicating the dates and the amount of water added. The record can then be used for establishing the frequency of subsequent inspection intervals. Maintenance of such a record will also serve as an aid in determining when corrective maintenance might be necessary. For example, a sudden decrease in water level would indicate that a leakage had developed.

(2) When the boiler is filled to the top of the scribed circle it contains approximately 60 cc of water. The amount of distilled water required to raise the level from the bottom of the scribed circle to the proper level is approximately 35 cc. When the level is below the bottom of the scribed circle, add water in 12 cc increments until the volume of additional water required can be determined by interpolation. *For example,* if the water level is three-fourths of the distance from the bottom to the top of the scribed circle, approximately 9 cc of distilled water is required for refilling. A hypodermic needle type syringe is supplied with each radio set for refilling the boiler.

(3) At each inspection interval check the hose for signs of deterioration and check for signs of leakage around the sight glass, tubing, and hose connections, pressure relief valve (at the end of the tube coming from the condenser), and the fill screw. Refer to higher level maintenance if inspection indicates the need for repair. If there is cause to suspect possible blockage of the pressure relief valve, it should be removed and plumbed with a piece of wire. To determine if the stoppage has been corrected, blow through the threaded end of the valve. When replacing the valve, be careful that the rubber seal does not ride up onto the tubing. The valve should be hand-tightened and the ball recess left facing up.

b. Adding Water. When the water level is low, add distilled water as follows:

(1) Remove the pin cap from the syringe plastic case and remove the syringe and needle protective cover.

CAUTION

The needle is very sharp. Be careful while handling it.

(2) Press the needle protective cover firmly against the syringe, securing the needle to the sysringe.

(3) Pull off the needle protective cover.

(4) Remove the fill screw from the condenser (fig. 4–2).

CAUTION

Do not overfill the boiler. Overfilling could cause percolation that would interfere with the cooling process.

(5) Fill the syringe with the desired amount of distilled water and add it to the vapor cooling system through the fill screw hole. Repeat this operation as necessary to obtain a level at the top of the scribed circle on the sight glass.

(6) Replace the fill screw and replace the syringe in the plastic case.

(7) Record the date and amount of distilled water added.

Section III. ORGANIZATIONAL MAINTENANCE (AN/FRC–80(V)1)

4–10. Scope

This section provides troubleshooting, testing, and removal and replacement procedures to be performed by organization maintenance. The troubleshooting chart lists only symptoms of troubles which can be corrected by organizational maintenance personnel using the tools and test equipment allocated. Testing consists of switchover and alarm circuit tests. Removal and replacement procedures consist of removal and replacement of plug-in relays in the switchover and alarm circuits. Replacement of fuses, at the front of the power supply and at the rear of the diverstiy combiner, is obvious.

4–11. Troubleshooting

a. General.

(1) Under normal operating conditions, only six indicator lamps are lit. These lamps include: either A OP or B OP, located on the sensing and control shelf assembly; HV and PWR, located on each of the two power supply assemblies; and a red power indicator lamp, located on the diversity combiner. Observation of indicator lamps provides a definite aid in troubleshooting.

(2) The troubleshooting chart can be broken into two segments: symptoms which may be observed on the equipment during normal operation (items 1 through 4); and symptoms which may be observed when performing switchover and alarm operational tests (para 4–12) to isolate a faulty plug-in relay (items 5 through 20).

(3) Items 1 through 4 in the trobuleshooting chart list the different system symptoms that

can be used to help isolate faults which can be repaired at the organizational maintenance level. A trouble symptom is recognized by visually checking indicator lamps. If the symptom can be matched with one of those in the troubleshooting chart, corrective action should be taken. However, if the sumptom cannot be matched with one on the troubleshooting chart, higher level maintenance should be called immediately.

(4) Items 5 through 20 in the troubleshooting chart are keyed to the switchover and alarm tests in paragraph 4–12. In the procedure of paragraph 4–12, specific troubles are induced in the radio set to cause specific alarms to occur and to cause contact closure for external alarm equipment. The troubleshooting chart isolates a faulty plug-in relay as the probable cause of trouble when a contact closure is not obtained for a given alarm condition.

b. Troubleshooting Chart.

Item No.	*Symptom*	*Probable Cause*	*Corrective Action*
1	The following lamps are lit: Combiner input 1 pilot receiver FAULT Combiner output pilot receiver FAULT COMB BYPASS COMB AMP RX A	Faulty diversity combiner or loss of primary power input to diversity combiner.	*a.* If red power indicator lamp on diversity combiner is not lit, check F1–1AMP fuse at rear of combiner and replace if necessary. If fuse is good, check for loss of 117V ac input. *b.* If the red indicator lamp is lit, refer equipment to higher level maintenance for repair.
2	The following lamps are lit: Receiver pilot receivers (A) and (B) FAULT Combiner input 1 pilot receiver FAULT Combiner input 2 pilot receiver FAULT Combiner output pilot receiver FAULT	Loss of microwave signal from transmitter terminal or double failure at the receiver terminal.	On both rt assemblies set 1A1S4 and 1A4S4 switches to REC LEV and check both 25–0–25 meter indications. If both meter indications are approximately zero, the transmitters at the distant terminal are probably faulty. If both meter indications do not drop to approximately zero, refer equipment to higher level maintenance.
2.1	Combiner input 1 pilot receiver FAULT lamp is lit.	Blown fuse 1A2A2F1 on power converter (A).	*a.* Check fuse 1A2A2F1 on power converter (A). *b.* If fuse 1A2A2F1 is blown, replace it with a 1-amp fuse. *c.* If fuse is not blown, combiner input 1 pilot receiver is probably faulty. Refer equipment to higher level maintenance.
2.2	Combiner input 2 pilot receiver FAULT lamp is lit.	Blown fuse 1A5A2F1 on power converter (B).	*a.* Check fuse 1A5A2F1 on power converter (B). *b.* If fuse 1A5A2F1 is blown, replace it with a 1-amp fuse. *c.* If fuse is not blown, combiner input 2 pilot receiver is probably faulty. Refer equipment to higher level maintenance.
3	Power supply assembly (A) PWR indicator lamp is not lit.	Loss of input power or blown fuse.	*a.* Check for −25 ±3V dc between −25 VDC and COM test points on power converter (A) at rear of equipment rack. If voltage is normal, push in on power supply front panel to make sure interlock switch is engaged. *b.* If voltage measured is *a* is not normal, check fuse F1 and replace if necessary (replace F1 with 4-amp fuse for 117V ac primary power, or 2-amp fuse for 220V ac primary power). If fuse is good, refer equipment to higher level of maintenance for repair.

Item No.	Symptom	Probable Cause	Corrective Action
4	Power suply assembly (B) PWR indicator lamp is not lit.	Loss of input power or blown fuse.	*a.* Check for −25 ±3V dc between −25 VDC and COM test points on power converter (B) at rear of equipment rack. If voltage is normal, push in on the power supply front panel to make sure interlock switch is engaged. *b.* If voltage measured in *a* is not normal, check fuse F1 and replace if necessary (replace F1 with 4-amp fuse for 117V ac primary power, or 2-amp fuse for 220V ac primary power). If fuse is good, refer equipment to higher level of maintenance for repair. *Note.* Refer to figure 4–3 for location of relays. Replacement procedure for relays is given in paragraph 4–13.
5	No contact closure between 1A7TB1 terminals 3A and 3B (para 4–12*b*(2)).	Faulty relay 1A7K5.	Replace plug-in relay 1A7K5.
6	No contact closure between 1A7TB1 terminals 4A and 4B (para 4–12*b*(2)).	Faulty relay 1A7K7.	Replace plug-in relay 1A7K7.
7	No contact closure between 1A7TB1 terminals 3F and 3G (para 4–12*b*(5)).	Faulty relay 1A7K6.	Replace plug-in relay 1A7K6.
8	No contact closure between 1A7TB1 terminals 4F and 4G (para 4–12*b*(5)).	Faulty relay 1A7K8.	Replace plug-in relay 1A7K8.
9	No contact closure between 1A7TB1 terminals 2A and 2B (para 4–12*c*(2)).	Faulty relay 1A7K3.	Replace plug-in relay 1A7K3.
10	No contact closure between 1A7TB1 terminals 2F and 2G (para 4–12*c*(4)).	Faulty relay 1A7K4.	Replace plug-in relay 1A7K4.
11	No contact closure between 1A7TB1 terminals 5A and 5B (para 4–12*e*(2)).	Faulty relay 1A7K9.	Replace plug-in relay 1A7K9.
12	No contact closure between 1A7TB1 terminals 7A and 7B (para 4–12*e*(2).	Faulty relay 1A7K16.	Replace plug-in relay 1A7K16.
13	No contact closure between 1A7TB1 terminals 5F and 5G (para 4–12*e*(4)).	Faulty relay 1A7K10.	Replace plug-in relay 1A7K10.
14	No contact closure between 1A7TB1 terminals 7F and 7G (para 4–12*e*(4)).	Faulty relay 1A7K18.	Replace plug-in relay 1A7K18.
15	No contact closure between 1A7TB1 terminals 8A and 8B (para 4–12*e*(6)).	Faulty relay 1A7K17.	Replace plug-in relay 1A7K17.
16	No contact closure between 1A7TB1 terminals 1A and 1B (para 4–12*f*(2)).	If relay 1A7K17 was not faulty in 15 above, probable cause is relay 1A7K19.	Replace plug-in relay 1A7K19.
17	No contact closure between 1A7TB1 terminals 6A and 6B (para 4–12*f*(2)).	Faulty relay 1A7K12.	Replace plug-in relay 1A7K12.

Item No.	Symptom	Probable Cause	Corrective Action
18	No baseband output to external multiplex equipment under test conditions of paragraph 4–12*f*(1) and (2).	Faulty relay 1A7K15 or 1A7K14.	Replace faulty plug-in relay.
19	No contact closure between 1A7TB1 terminals 6A and 6B (para 4–12*f*(2)).	Faulty relay 1A7K11.	Replace plug-in relay 1A7K11.
20	No baseband output to external multiplex equipment under test conditions of paragraph 4–12*f*(3) and (4).	Faulty relay 1A7K11 or 1A7K14.	Replace faulty plug-in relay.

4–12. Switchover and Alarm Operation Tests

This procedure provides information to test the condition of various switchover and alarm indicator points.

a. Alarm Relay Status Test.

(1) Combiner bypass and alarm Shelf Assembly 1A7 contains 18 different relays that provide either open or closed contact outputs whenever a sensing level is abnormal. The relay contacts are wired to the back side of terminal board 1A7TB1. The front side of this terminal board provides connection points for external alarm indicators.

(2) Terminal board 1A7TB1 (fig. 6–2) uses a grid type co-ordinate system for locating terminals. Each horizontal row of terminals is identified by a number, and each vertical row is identified by a letter. Thus, the eight terminals in the first row are identified as 1A, 1B, 1C, etc.; the second row terminals are 2A, 2B, 2C, etc.

(3) When testing the status of the alarm relays, the type of connections made to the output terminals must be considered. For example, if the output terminals are connected to the external alarm circuit, a voltage is normally present between the open terminals, therefore, a voltmeter, not an ohmmeter, must be used to check the closure. If the output terminals are not connected to the external alarm circuit, no voltage is applied and an ohmmeter can be used to test the relay condition. Use multimeter AN/USM–210 for making relay status checks.

(4) The alarm test points listed in the chart below shows which 1A7TB1 terminals are connected to normally closed relay contacts and which are connected to normally open relay contacts. The two terminals shown in the "Closed circuit" column provide a closed circuit during normal conditions and the terminals shown in the "Open circuit" column provide an open circuit during normal conditions. When an alarm occurs, these terminals then provide a reverse condition.

1A7TB1 terminals		
Closed circuit	*Open circuit*	*Controlling circuit and alarm function*
1B–1C	1A–1B	Combiner output pilot receiver 1A7A2 (monitors combiner amplifier)
2B–2C	2A–2B	Transmitter pilot receiver (A) 1A3A2 (monitors transmitter (A) pilot)
3B–3C	3A–3B	Transmitter control (A) 1A3A1 (monitors transmitter (A) power/frenquency)
4B–4C	4A–4B	RF control 1A3A9 (transmitter (A) RF switch)
5B–5C	5A–5B	Receiver pilot receiver (A) 1A3A3 (monitors receiver (A) pilot)
6B–6C	6A–6B	Diversity combiner 1A8 (monitors combiner bypass
7B–7C	7A–7B	Combiner input 1 pilot receiver 1A7A1 (monitors combiner input 1 pilot)
8B–8C	8A–8B	Combiner output pilot receiver 1A7A2 (montiors combiner output pilot)
2G–2H	2F–2G	Transmitter pilot receiver (B) 1A3A7 (monitors transmitter (B) pilot)
3G–3H	3F–3G	Transmitter control (B) 1A3A8 (monitor transmitter (B) power/frequency)
4G–4H	4F–4G	RF control 1A3A9 (monitors transmitter (B) rf switch)
5G–5H	5F–5G	Receiver pilot receiver (B) 1A3A6 (monitors receiver (B) pilot)
7G–7H	7F–7G	Combiner input 2 pilot receiver 1A7A3 (monitors combiner input 2 pilot)

b. Transmitter Fault and Alarm Test.

NOTE

TEST BAL switch must be held in + position to obtain contact closure readings on multimeter connected to terminals on 1A7TB1.

(1) On rt assembly 1A1, set the XMTR AFC switch to OFF and then hold the TEST BAL switch to the + position.

(2) With the TEST BAL switch at +, check for the following:

(*a*) On RF control 1A3A9, the A OP indicator lamp should turn off and the B OP indicator lamp should turn on.

(*b*) On transmitter control (A) 1A3A1, the RF SW FAULT and the FAULT indicator lamps should both turn on.

(*c*) On 1A7TB1, check for contact closure using multimeter between terminals 3A and 3B. Contact closure indicates relay 1A7K5 has operated. Check for contact closure between terminals 4A and 4B, indicating relay 1A7K7 has operated.

(3) On rt assembly 1A1, release the TEST BAL switch and set the XMTR AFC switch to the up (on) position. Check that the RF SW FAULT and FAULT indicator lamps on transmitter control 1A3A1 both turn off.

(4) On rt asssembly 1A4, set the XMTR AFC switch to OFF and hold the TEST BAL switch to the + position.

(5) With the TEST BAL switch at +, check for the following:

(*a*) On RF control 1A3A9, the B OP indicator lamp should turn off and the A OP indicator lamp should turn on.

(*b*) On transmitter control 1A3A8, the RF SW FAULT and FAULT indicator lamps should both turn on.

(*c*) On 1A7TB1, check for contact closure using multimeter between terminals 3F and 3G, indicating relay 1A7K6 has operated, and between terminals 4F and 4G, indicating relay 1A7K8 has operated.

(6) On rt assembly 1A4 release the TEST BAL switch and set the XMTR AFC switch to the up (on) position. Check that the RF SW FAULT and FAULT indicator lamps on transmitter control (B) 1A3A8 both turn off.

c. Transmitter Pilot Fault Test.

(1) On RF control 1A3A9, set the CH A–AUTO–CH B momentary switch to CH A.

(2) On transmitter pilot receiver (A) 1A3A2, connect a jumper between the INPUT and GND test points and check for the following:

(*a*) On RF control 1A3A9, check that the A OP lamp turned off and the B OP lamp turned on.

(*b*) On transmitter control 1A3A1, check that the RF SW FAULT lamp turned on.

(*c*) On transmitter pilot receiver (A) 1A3A2, check that the FAULT lamp turned on.

(*d*) On 1A7TB1, check for contact closure using multimeter between terminals 2A and 2B, indicating relay 1A7K3 has operated.

(3) Disconnect the jumper from 1A3A2 and connect it between the INPUT and GND test points on transmitter pilot receiver (B) 1A3A7.

(4) Check for the following:

(*a*) On RF control 1A3A9, check that the B OP lamp turned off and the A OP lamp turned on.

(*b*) On transmitter control (B) 1A3A8, check that the RF SW FAULT lamp turned on.

(*c*) On transmitter pilot receiver (B) 1A3A7, check that the FAULT lamp turned on.

(*d*) On 1A7TB1, check for contact closure using multimeter between terminals 2F and 2G, indicating relay 1A7K4 has operated.

(5) Disconnect the jumper from transmitter pilot receiver (B) 1A3A7.

d. RF Switch Test.

(1) On RF control 1A3A9, set the CH A–AUTO–CH B momentary switch to CH B.

(2) On RF control 1A3A9, connect a jumper between the A and GND test points and check for the following:

(*a*) On RF control 1A3A9, check that the A OP lamp turns on and the B OP lamp turns off.

(*b*) On transmitter control (A) 1A3A1, check the RF SW FAULT lamp turned on.

(3) Disconnect the jumper from 1A3A9 and check that the RF SW FAULT lamp remains turned on.

(4) On RF control 1A3A9, set the CH A–AUTO–CH B momentary switch to CH B and check that the RF SW FAULT lamp on transmitter control (A) 1A3A1 turns off.

(5) On RF control 1A3A9, connect a jumper between the B and GND test points and check for the following:

(*a*) On 1A3A9 RF control, check that the A OP lamp turns on and the B OP lamp turns off.

(*b*) On transmitter control (B) 1A3A8, check that the RF SW FAULT lamp turned on.

(6) On RF control 1A3A9, set the CH A–AUTO–CH B momentary switch to CH A and check that the RF SW FAULT lamp turns off.

e. Receiver Fault and Alarm Test.

(1) On squelch receiver 1A1A1, connect a jumper between the SQ FAULT and GND test points.

(2) Check for the following:

(*a*) On receiver pilot receiver (A) 1A3A3 and combiner input 1 pilot receiver 1A7A1, check that the FAULT lights turn on.

(*b*) On 1A7TB1, check for contact closure using multimeter between terminals 5A and 5B, indicating relay 1A7K9 has operated, and between terminals 7A and 7B, indicating relay 1A7K16 has operated.

(3) Disconnect the jumper from squelch receiver 1A1A1 and connect it between the SQ FAULT and GND test points on squelch receiver 1A4A1.

(4) Check for the following:

a. On receiver pilot receiver (B) 1A3A6 and combiner input 1 pilot receiver 1A7A3, check that the FAULT lights turn on.

(*b*) On 1A7TB1, check for contact closure using multimeter between terminals 5F and 5G, indicating relay 1A7K10 has operated, and between terminals 7F and 7G, indicating relay 1A7K18 has operated.

(5) Repeat (1) above and check that the FAULT lamps on all five receiver pilot receivers (1A3A3, 1A3A6, 1A7A1, 1A7A2, and 1A7A3) are turned on.

(6) On 1A7ATB1, check for contact closure using multimeter between terminals 8 and 8B (see *a* above) indicating relay 1A7K17 has operated.

(7) Remove the jumpers from the squelch receiver and check that the five FAULT indicator lamps, which were turned on in (5), are turned off.

f. Video Combiner Fault Alarm Test.

(1) Connect a jumper between the SQ FAULT and GND test points on squelch receiver 1A1.

(2) At the rear of combiner bypass and alarm shelf assembly 1A7, disconnect the coaxial cable from COMBINED BB INPUT jack 1A7J27 and check for the following:

(*a*) The FAULT lamps on receiver pilot receivers 1A3A3, 1A7A1, 1A7A2, and 1A7A3 are turned on.

(*b*) The RX B, COMB AMP, and COMB BYPASS lamps on combiner bypass and alarm shelf assembly 1A7 are turned on.

(*c*) On 1A7TB1, check for contact closure using multimeter between terminals 1A and 1B (see *a* above), indicating relay 1A7K19 has operated, and between terminals 6A and 6B indicating relays 1A7K12, 1A7K14, and 1A7K15 have operated and the diversity combiner is being bypassed by the channel B receiver.

(3) Remove the jumper from squelch receiver 1A1A1 and connect it between the SQ FAULT and GND test points on squelch receiver 1A4A1.

(4) With the coaxial cable still disconnected from 1A7J27, check for the following:

(*a*) The FAULT lamp on receiver pilot receivers 1A3A6, 1A7A1, 1A7A2, and 1A7A3 are turned on.

(*b*) The RXA, COMB AMP, and COMB BYPASS lamps on combiner bypass and alarm shelf assembly 1A7 are turned on.

(*c*) On 1A7TB1, check for contact closure using multimeter between terminals 6A and 6B (see *a* above) indicating relays 1A7K11, 1A7K13, and 1A7K14 have operated and that the diversity combiner is being bypassed by the channel A receiver.

(5) Remove the jumper from squelch receiver 1A4A1 and reconnect the coaxial cable to COMBINED BB INPUT 1A7J27 jack. The lamps that were turned on in (4) (*a*) and (4) (*b*) should now be turned off.

(6) On rt assembly 1A1, set S3 to PLT–R. Depress the METER switch on combiner output pilot receiver 1A7A2 and note the meter indication.

(7) Disconnect the coaxial cable from BB OUTPUT RX A connector 1A7J24.

(8) Check that the FAULT lamp on combiner input 1 pilot receiver 1A7A1 is turned on. Depress the METER switch on 1A7A2 and check that the meter indication is the same as noted in (6).

(9) Reconnect the coaxial cable to BB OUTPUT RX A 1A7J24 connector and then disconnect the coaxial cable from BB OUTPUT RX B connector 1A7J25.

(10) Check that the FAULT lamp on pilot receiver 1A7A3 is turned on. Depress the

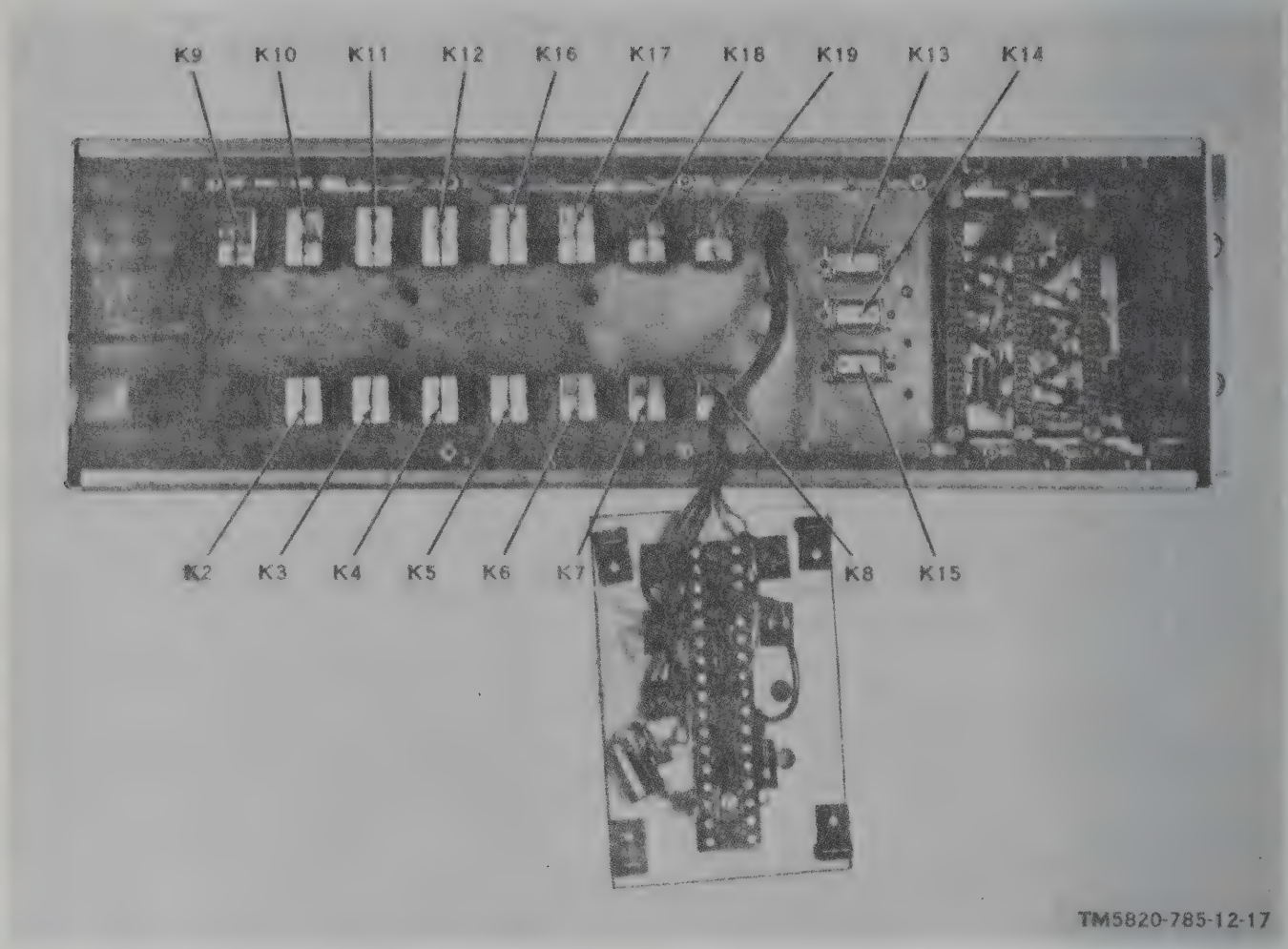


Figure 4–3. Combiner bypass and alarm panel 1A7, front view, location of plug-in relays.

METER switch on combiner input 2 pilot receiver 1A7A2 and check that the meter indication is the same as noted in (6).

(11) Reconnect the coaxial cable to BB OUTPUT RX B connector 1A7J25.

4–13. Removal and Replacement of Plug-in Relays

Relays which can be replaced at the organizational level are located in combiner bypass and alarm panel 1A7. Refer to figure 4–3 for location of the relays.

a. Removal.

(1) Remove the three blank panels on the left half of combiner bypass and alarm panel 1A7. These panels are spring-clipped to the flanges on the front of the housing. Use a screwdriver to pry the spring clips free of the housing.

(2) Locate the relay to be replaced. Relays 1A7K2 through 1A7K12 and 1A7K16 through 1A7K19 have wire spring clip retainers which must be moved aside, then the relay can be removed from its socket. Relays 1A7K13 through 1A7K15 are pulled directly out of the socket and holder.

b. Replacement.

(1) Plug the replacement into its socket. If it has a wire spring clip retainer, relocate the retainer over the relay into the groove at the center of the relay body.

(2) Replace the three blank panels by forcing the spring clips over the flanges on the front of the combiner bypass and alarm panel housing.

4–14. Repainting and Refinishing

Remove rust and corrosion from painted surfaces using fine sandpaper. Select semigloss enamel paint in a matching haze beige color listed in SB 11–573. Repaint the sanded area as instructed in TB 746–10.

Section IV. ORGANIZATIONAL MAINTENANCE (AN/FRC-80(V)2, 3)

4-15. Scope

This section provides troubleshooting, testing, and removal and replacement procedures to be performed by organizational maintenance. The troubleshooting chart lists only symptoms of troubles which can be corrected by organizational maintenance personnel using the tools and test equipment allocated. Testing consists of switchover and alarm circuit tests. Removal and replacement procedures consist of removal and replacement of plug-in relays in the alarm circuits. Replacement of fuses at the front of the power supply is obvious.

4-16. Troubleshooting

a. General.

(1) Under normal operating conditions, only seven indicator lamps are lighted. These lamps include either A OP or B OP and both CH OP, located on the sensing and control shelf assembly; and HV and PWR, located on each of the two power supply assemblies. Observation of indicator lamps provides a define aid in troubleshooting.

(2) The troubleshooting chart can be broken into two segments; symptoms which may be observed on the equipment during normal operation (items 1 through 5); and symptoms which may be observed when performing switchover and alarm operational tests (para 4-17) to isolate a faulty plug-in relay (items 6 through 19).

(3) Items 1 through 5 in the trobuleshooting chart list the different system symptoms that can be used to help isolate faults which can be repaired at the organizational maintenance category. A trouble symptom is recognized by visually checking indicator lamps. If the symptom can be matched with one of those in the troubleshooting chart, corrective action should be taken. However, if the symptom cannot be matched with one on the troubleshooting chart, higher category of maintenance should be notified immediately.

(4) Items 6 through 19 in the troubleshooting chart are keyed to the switchover and alarm tests in paragraph 4-17. In the procedure of paragraph 4-17, specific troubles are induced in the radio set to cause specific alarms to occur and to cause contact closure for external alarm equipment. The troubleshooting chart isolates a faulty plug-in relay as the probable cause of trouble when a contact closure is not obtained for a given alarm condition.

b. Troubleshooting Chart.

Item No.	*Symptom*	*Probable cause*	*Corrective action*
1	The following lamps are lighted: Receiver pilot receivers (A) and (B) FAULT. Receiver (A) and (B) FAULT. Receiver (A) and (B) REC LEV FAULT. Both CH OP lamps are off.	Loss of microwave signal from transmitter terminal or double failure at the receiver terminal.	On both rt assemblies, set 1A1S4 and 1A4S4 switches to REC LEV and check both 25-0-25 meter indications. If both meter indications are approximately zero, the transmitters at the distant terminal are probably faulty. If both meter indications do not drop to approximately zero, refer equipment to higher category of maintenance.
2	AUX A PWR FAULT lamp	Blown fuse 1A2A2F1 on power converter (A).	*a.* Check fuse 1A2A2F1 on power converter (A). *b.* If fuse 1A2A2F1 is blown, replace it with a 1-ampere fuse. *c.* If fuse is not blown, refer equipment to higher category maintenance.
3	AUX B PWR FAULT lamp is lit.	Blown fuse 1A5A2F1 on power converter (B).	*a.* Check fuse 1A5A2F1 on power converter (B). *b.* If fuse 1A5A2F1 is blown, replace it with a 1-ampere fuse. *c.* If fuse is not blown, refer equipment to higher category of maintenance.
4	Power supply assembly (A) PWR indicator lamp is not lit.	Loss of input power or blown fuse	*a.* Check for −25 ± 3v dc between −25 vdc and COM test points on power converter (A) at rear of equipment. If voltage is normal, push in on

Item No.	Symptom	Probable cause	Corrective action
			power supply front panel to make sure interlock switch is engaged. *b.* If voltage measured in *a* above is not normal, check fuse 1A2A1F1 on the front of the power supply and replace if necessary. (Replace F1 with 4-ampere fuse for 117v ac primary power, or 2-ampere fuse for 200v ac primary power or 6-ampere fuse for 48v dc primary power.) If fuse is good, refer equipment to higher category of maintenance for repair.
5	Power supply assembly (B) PWR indicator lamp is not lit.	Loss of input power or blown fuse	*a.* Check for −25 ±3v dc between −25vdc and COM test points on power converter (B) at rear of equipment rack. If voltage is normal, push in on the power supply front panel to make sure interlock switch is engaged. *b.* If voltage measured in *a* above is not normal, check fuse 1A5A1F1 on the front of the power supply and replace if necessary. (Replace F1 with 4-ampere fuse for 117v ac primary power, or 2-ampere fuse for 220v ac primary power.) If fuse is good, refer equipment to higher category of maintenance for repair. *Note.* Refer to figure 4–4 for location of relays. Replacement procedure for relay is given in paragraph 4–18.
6	No contact closure between 1A3TB1 terminals D3 and D2 (para 4–17*b*(2)).	Faulty relay 1A3A15K5	Replace plug-in relay 1A3A15K5.
7	No contact closure between 1A-3TB1 terminals B3 and B2 (para 4–17*b*(2)).	Faulty relay 1A3A15K7	Replace plug-in relay 1A3A15K7.
8	No contact closure between 1A3TB1 terminals C3 and C2 (para 4–17*b*(5)).	Faulty relay 1A3A15K6	Replace plug-in relay 1A3A15K6.
9	No contact closure between 1A-3TB1 terminals A3 and A2 (para 4–17*b*(5)).	Faulty relay 1A3A15K8	Replace plug-in relay 1A3A15K8.
10	No contact closure between 1A-3TB1 terminals F3 and F2 (para 4–17*c*(2)).	Faulty relay 1A3A15K3	Replace plug-in relay 1A3A15K3.
11	No contact closure between 1A-3TB1 terminals E3 and E2 (para 4–17*c*(4)).	Faulty relay 1A3A15K4	Replace plug-in relay 1A3A15K4.
12	No contact closure between 1A-3TB1 terminals B10 and B9 (para 4–17*e*(2)).	Faulty relay 1A3A15K18	Replace plug-in relay 1A3A15K18.
13	No contact closure between 1A-3TB1 terminals D10 and D9 (para 4–17*e*(2)).	Faulty relay 1A3A15K16	Replace plug-in relay 1A3A15K16.
14	No contact closure between 1A-3TB1 terminals H10 and H9 (para 4–17*e*(2)).	Faulty relay 1A3A15K9	Replace plug-in relay 1A3A15K9.
15	No contact closure between 1A3TB1 terminals A10 and A9 (para 4–17*e*(1)).	Faulty relay 1A3A15K19	Replace plug-in relay 1A3A15K19.

Item No.	Symptom	Probable cause	Corrective action
16	No contact closure beween 1A3TB1 terminals C10 and C9 (para 4–17*e*(1)).	Faulty relay 1A3A15K17	Replace plug-in relay 1A3A15K17.
17	No contact closure between 1A3TB1 terminals G10 and G9 (para 4–17*e*(4)).	Faulty relay 1A3A15K10	Replace plug-in relay 1A3A15K10.
18	No contact closure between 1A-3TB1 terminals F10 and F9 (para 4–17*f*(3)).	Faulty relay 1A3A15K11	Replace plug-in relay 1A3A15K11.
19	No contact closure between 1A3TB1 terminals E10 and E9 (para 4–17*f*(7)).	Faulty relay 1A3A15K12	Replace plug-in relay 1A3A15K12.

4–17. Switchover and Alarm Operation Tests

This procedure provides information to test the condition of various switchover and alarm indicator points.

a. Alarm Relay Status Test.

(1) Alarm relay panel 1A3A15 contains 14 different relays that provide either open or closed contact outputs whenever a sensing level is abnormal. The relay contacts are wired to the back of terminal board 1A3TB1. The front of this terminal board provides connection points for external alarm indicators.

(2) Terminal board 1A3TB1 (figs. 6–3 and 6–4) uses a grid-type coordinate system for locating terminals. Each horizontal row of terminals is identified by a number, and each vertical row is identified by a letter. Thus, the eight terminals in the first row are identified as A1, A2, A3, etc; the second row terminals as B1, B2, B3, etc.

(3) When testing the status of the alarm relays, the type of connections made to the output terminals must be considered.

For example, if the output terminals are connected to the external alarm circuit, a voltage is normally present between the open terminals; therefore, a voltmeter, not an ohmmeter, must be used to check the closure. If the output terminals are not connected to the external alarm circuit, no voltage is applied and an ohmmeter can be used to test the relay condition. Use Multimeter AN/USM–210 for making relay status checks.

(4) The alarm points listed in the chart below show which 1A3TB1 terminals are connected to normally-closed relay contacts and which are connected to normally-open relay contacts. The two terminals shown in the *Closed circuit* column provide a closed circuit during normal conditions and the terminals shown in the *Open circuit* column provided an open circuit during normal conditions. When an alarm occurs, these terminals provide a reverse condition.

1A3TB1 terminals		
Closed circuit	*Open circuit*	*Controlling circuit and alarm function*
F1–F2	F3–F2	Transmitter pilot receiver (A) 1A3A2 (monitors transmitter (A) pilot).
D1–D2	D3–D2	Transmitter control (A) 1A3A1 (monitors transmitter (A) power/frequency).
B1–B2	B3–B2	RF control 1A3A9 (transmitter (A) RF switch).
H8–H9	H10–H9	Receiver pilot receiver (A) 1A3A3 (monitors receiver (A) pilot).
D8–D9	D10–D9	Receiver control (A) 1A3A14 (monitors receiver (A) level).
B8–B9	B10–B9	Receiver control (A) 1A3A14 (monitors receiver (A) squelch).
E1–E2	E3–E2	Transmitter pilot receiver (B) 1A3A7 (monitors transmitter (B) pilot).
C1–C2	C3–C2	Transmitter control (B) 1A3A8 (monitors transmitter (B) power frequency).
A1–A2	A3–A2	RF control 1A3A9 (monitors transmitter (B) RF switch).
G8–G9	G10–G9	Receiver pilot receiver (B) 1A3A6 (monitors receiver (B) pilot).
C8–C9	C10–C9	Receiver control (B) 1A3A12 (monitors receiver (B) level).
A8–A9	A10–A9	Receiver control (B) 1A3A12 (monitors receiver (B) squelch).
F8–F9	F10–F9	Alarm relay panel 1A3A15 (monitors −24v (A) supply).
E8–E9	E10–E9	Alarm relay panel 1A3A15 (monitors −24v (B) supply).

b. Transmitter Fault and Alarm Test.

NOTE

TEST BAL switch must be held in + position to obtain contact closure readings on multimeter connected to terminals on 1A3TB1.

(1) On RF assembly 1A1, set the XMTR AFC switch to OFF and hold the TEST BAL switch to the + position.

(2) With the TEST BAL switch at +, check for the following:

(*a*) On RF control 1A3A9, the A OP indi-

cator lamp should turn off and the B OP indicator lamp should turn on.

(*b*) On transmitter control (A) 1A3A1, the RF SW FAULT and the FAULT indicator lamps should both turn on.

(*c*) On 1A3TB1, check for contact closure, using multimeter between terminals D3 and D2. Contact closure indicates relay 1A3A15K5 has operated. Check for contact closure between terminals B3 and B2 indicating relay 1A3A15K7 has operated.

(3) On rt assembly 1A1, release the TEST BAL switch and set the XMTR AFC switch to the up (ON) position. Be sure the RF SW FAULT and FAULT indicator lamps on transmitter control 1A3A1 both turn off.

(4) On rt assembly 1A4, set the XMTR AFC switch to OFF and hold the TEST BAL switch to the + position.

(5) With the TEST BAL switch at +, check for the following:

(*a*) On RF control 1A3A9, the B OP indicator lamp should turn off and the A OP indicator lamp should turn on.

(*b*) On transmitter control 1A3A8, the RF SW FAULT and FAULT indicator lamps should both turn on.

(*c*) On 1A3TB1, check for contact closure, using multimeter between terminals C3 and C2, indicating relay 1A3A15K6 has operated, and between terminals A3 and A2, indicating relay 1A3A15K8 has operated.

(6) On rt assembly 1A1, release the TEST BAL switch and set the XMTR AFC switch to the up (ON) position. Be sure the FR SW FAULT and FAULT indicator lamps on transmitter control (B) 1A3A8 both turn off.

c. Transmitter Pilot Fault Test.

(1) On RF control 1A3A9, set the CH A–AUTO–CH B momentary switch to CH A.

(2) On transmitter pilot receiver (A) 1A3A2, connect a jumper between the INPUT and GND test points and check for the following:

(*a*) On RF control 1A3A9, be sure the A OP lamp turns off and the B OP lamp turns on.

(*b*) On transmitter control 1A3A1, be sure the RF SW FAULT lamp turns on.

(*c*) On transmitter pilot receiver (A) 1A3A2, be sure the FAULT lamp turns on.

(*d*) On 1A3TB1, check for contact closure, using multimeter between terminals F3 and F2, indicating relay 1A3A15K3 has operated.

(3) Disconnect the jumper from 1A3A2 and connect it between the INPUT and GND test points on transmitter pilot receiver (B) 1A3A7.

(4) Check for the following:

(*a*) On RF control 1A3A9, be sure the B OP lamp turns off and the A OP lamp turns on.

(*b*) On transmitter control (B) 1A3A8, be sure the RF SW FAULT lamp turns on.

(*c*) On transmitter pilot receiver (B) 1A3A7, be sure the FAULT lamp turns on.

(*d*) On 1A3TB1, check for contact closure, using multimeter between terminals E3 and E2, indicating relay 1A3A15K4 has operated.

(5) Disconnect the jumper from transmitter pilot receiver (B) 1A3A7.

d. RF Switch Test.

(1) On RF control 1A3A9, set the CH A–AUTO–CH B momentary switch to CH B.

(2) On RF control 1A3A9, connect a jumper between the A and GND test points and check for the following:

(*a*) On RF control 1A3A9, be sure the A OP lamp turns on and the B OP lamp turns off.

(*b*) On transmitter control (A) 1A3A1, be sure the RF SW FAULT lamp turns on.

(3) Disconnect the jumper from 1A3A9 and be sure the RF SW FAULT lamp remains turned on.

(4) On RF control 1A3A9, set the CH A–AUTO–CH B momentary switch to CH B and be sure the RF SW FAULT lamp on transmitter control (A) 1A3A1 turns off.

(5) On RF control 1A3A9, connect a jumper between the B and GND test points and check for the following:

(*a*) On 1A3A9 RF control, be sure the A OP lamp turns on and the B OP lamp turns off.

(*b*) On transmitter control (B) 1A3A8, be sure the RF SW FAULT lamp turns on.

(6) On RF control 1A3A9, set the CH A–AUTO–CH B momentary switch to CH A and be sure the RF SW FAULT lamp turns off.

e. Receiver Fault and Alarm Test.

(1) On squelch receiver 1A1A1, connect a jumper between the SQ FALUT and GND test points.

(2) Check for the following:

(*a*) On receiver pilot receiver (A) 1A3A3, be sure the FAULT light turns on.

(*b*) On receiver control (A) 1A3A14, be sure the SQ FAULT light turns on.

(*c*) On squelch control 1A3A13, be sure the A LEV FAULT light turns on.

(*d*) On baseband switch (A) 1A3A4, be sure the CH OP light turns off.

(*e*) On 1A3TB1, check for contact closure, using multimeter between terminals B10 and B9, indicating relay 1A3A15K18 has operated; between terminals D10 and D9, indicating relay 1A3A15K16 has operated; and between terminals H10 and H9, indicating relay 1A3A15K9 has operated.

(3) Disconnect the jumper from squelch receiver 1A1A1 and connect it between the SQ FAULT and GND test points on squelch receiver 1A4A1.

(4) Check for the following:

(*a*) On receiver pilot receiver (B) 1A3A6, be sure the FAULT light turns on.

(*b*) On receiver control (B) 1A3A12, be sure the SQ FAULT light turns on.

(*c*) On squelch control 1A3A3, be sure the B LEV FAULT light turns on.

(*d*) On baseband switch (B) 1A3A5, be sure the CH OP light turns off.

(*e*) On 1A3TB1, check for contact closure, using multimeter between terminals A10 and A9, indicating relay 1A3A15K19 has operated; between terminals C10 and C9, indicating relay 1A3A15K17 has operated; and between terminals G10 and G9, indicating relay 1A3A15K10 has operated.

(5) Disconnect jumper from squelch receiver 1A4A1, All FAULT lamps should turn off and both CH OP lamps should light.

f. Auxiliary Power Fault and Alarm Test.

(1) On power converter (A) 1A2A2, remove fuse 1A2A2F1.

(2) On alarm board 1A3A10, AUX A PWR FAULT lamp should light.

(3) On 1A3TB1, check for contact closure, using multimeter between terminals F10 and F9, indicating relay 1A3A15K11 has operated.

(4) Replace fuse 1A2A2F1.

(5) On power converter (B) 1A5A2, remove fuse 1A5A2F1.

(6) On alarm board 1A3A10, AUX B PWR FAULT lamp should light.

(7) On 1A3TB1, check for contact closure, using multimeter between terminals E10 and E9, indicating relay 1A3A15K12 has operated.

(8) Replace fuse 1A5A2F1.

4–18. Removal and Replacement of Plug-In Relays

Relays which can be replaced at the organizational maintenance category are located in alarm relay panel 1A3A15 on the rear of the sensing and control shelf. Refer to figure 4–4 for location of relays.

a. Removal. Locate the relay to be replaced. All relays have wire spring clip retainers which must be moved aside; the relay can then be removed from its socket.

b. Replacement. Plug the replacement relay into its socket. Relocate the retainer over the relay into the groove at the center of the relay.

4–19. Repainting and Refinishing

Remove rust and corrosion from painted surfaces, using fine sandpaper. Select semigloss enamel in a matching haze beige color listed in SB 11–573. Repaint the sanded area as instructed in TB 746–10.

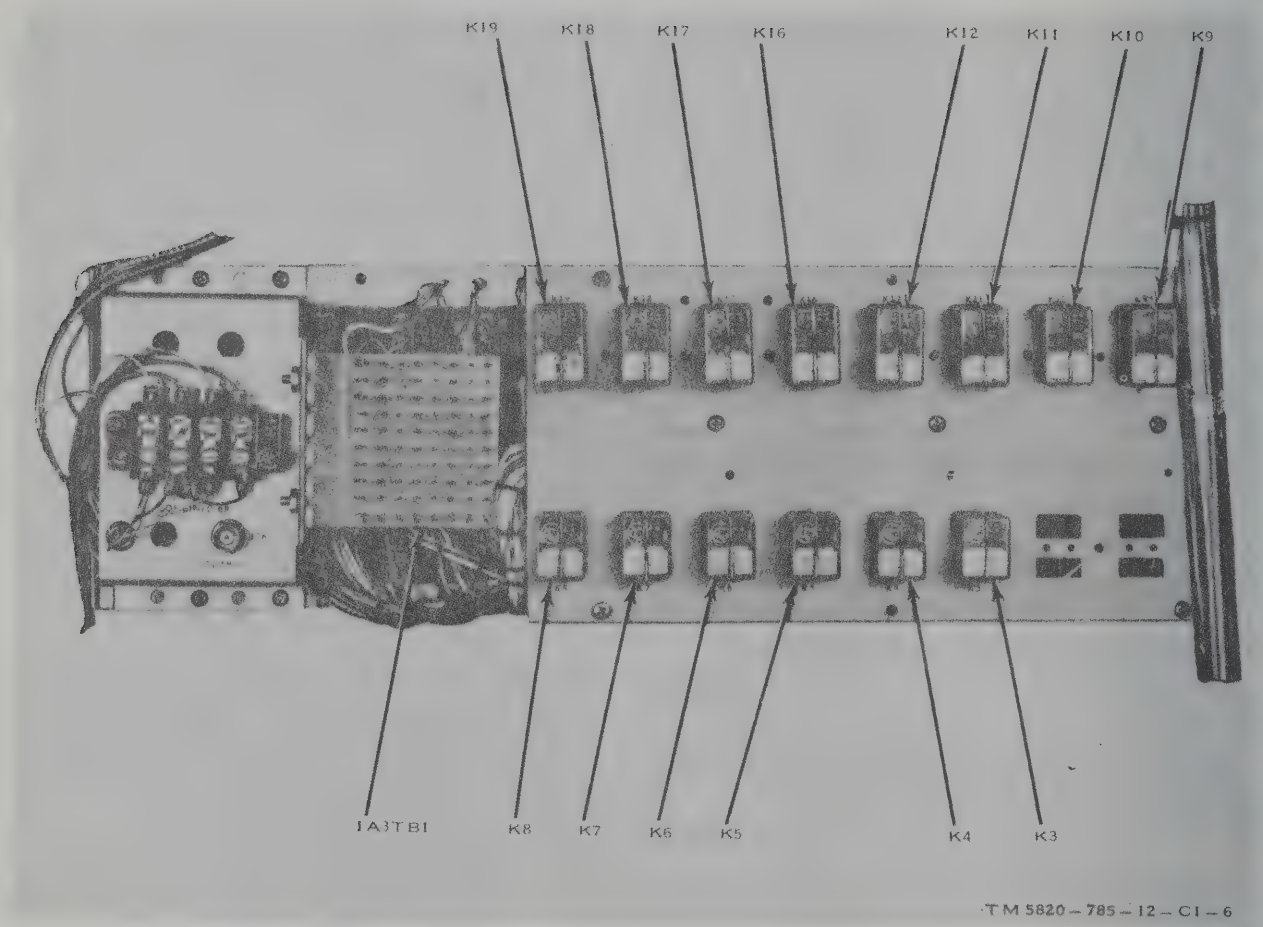


Figure 4.4. Alarm relay panel 1A3A15, front view, location of plug-in relays (AN/FRC–80(V)2, 3).

CHAPTER 5

AUXILIARY EQUIPMENT

5–1. General

Auxiliary equipments used with the radio set are: Diversity Combiner CV–2692/GR and Baseband Interconnection-Monitor Panels SB–3413/FRC–151(V) through SB–3416/FRC–151(V) and tunnel diode amplifier assembly 6290803.

5–2. Diversity Combiner CV–2692/GR

The diversity combiner is used in the AN/FRC–80(V)1 only for combining the baseband outputs of the two receivers of the radio set which are connected to separate antennas in space diversity configuration. The diversity combiner is required as an operating component of the radio set. System alignment, system adjustment, and system test procedures for the diversity combiner required in the overall operation of the radio set is provided in the technical manuals for the radio set. Detailed maintenance, operating procedures, functioning of equipment, etc, is provided in TM 11–5805–570–15.

5–3. Baseband Interconnection-Monitor Panels SB–3413/FRC–151(V) through SB–3416/FRC–151(V)

The baseband interconnection-monitor panels are not required as operating components of the radio set. They are used for interface between the radio set and external alarm monitor equipment. For all information on the baseband interconnection-monitor panels, refer to TM 11–5805–15.

5–4. Tunnel Diode Amplifier Assembly 6290803

a. Purpose. Tunnel diode amplifier assembly 6290803 is used as a low noise rf amplifier in the front end of the channel A and B receivers of the radio set. Channel A receiver uses a 6290803–1 configuration, and a 6290803–2 configuration is used in channel B receiver. In some communication links, there exists a very difficult radio path which can cause very weak signals to be present at the receiver. Since the noise generated in the front end of the receiver is the limiting factor in receiving very weak signals, some radio sets are equipped with a tunnel diode amplifier. The amplifier provides signal levels that are adequate for the processing of the weak rf signal. The amplifier exhibits very low noise characteristics. At present, there are not many AN/FRC–80(V)3 radio sets that are equipped with the tunnel diode amplifier. The information that follows is applicable to the AN/FRC–80(V)3 radio sets that are equipped with the tunnel diode amplifier assembly. (The four "XXXX" following the model ACP letters denote the radiofrequency in which the tunnel diode is designed to operate.)

b. Technical Characteristics.

Operating temperature rating:	−10° C. to +55° C., ±1 dB maximum gain variation, or −20° C. to +60° C., ±2 dB maximum gain variation.
Nonoperating temperature rating:	−40° C. to +70° C.

CAUTION

Unless otherwise specified, storage at temperatures outside the nonoperating temperature range may cause permanent damage or reduced service life.

Operating voltage: 12 vdc.

c. Description (fig. 5–1). The basic tunnel diode amplifier consists of an amplifier module mounted on a circulator. The amplifier module contains a tunnel diode, microwave matching circuitry, and a dc-bias circuit. The basic tunnel diode amplifier constitutes a single stage of amplication and generally employs a four-port circulator with one of its ports terminated in a matched load. The function of the load is to absorb mismatch reflections which might otherwise adversely affect amplifier performance. The remaining ports are designated as the input port, the amplifier port, and the output port.

d. Installation Procedure.

NOTE

The following installation procedures must be performed by direct support maintenance personnel.

Installation consists of connecting the unit in the system with the amplifier input port on the input or antenna side and the amplifier output on the output or receiver side. The bias supply is then applied through the amplifier-bias-supply connector. The bias supply for the unit is 12 vdc. Refer to figures 5–1, 5–2, and 6–4 for details on mounting the tunnel diode amplifier. The 10–dB attenuator is inserted between radio set IF-preamplifier 1A1A7A2 (1A4A7A2) and time delay equalizer 1A1A7A6 (1A4A7A6). Remove cable connected to time delay equalizer A6 connector J1 and connect the 10–dB attenuator to the cable. Connect the other end of the attenuator to time delay equalizer connector J1.

e. Power Connection. Connect 12 vdc from the AN/FRC–80(V)3 radio set baseband monitor connector J2–7 (+12 vdc) and −8 (ground) to the channel B tunnel diode amplifier. Connect 12 vdc from baseband monitor connector J2–9 (+12 vdc) and −8 (ground) to the channel A tunnel diode amplifier. Use No. 22 AWG wire. Refer to the AN/FRC–80(V)3 radio set wiring diagram in TM 11–5820–785–35.

f. Control Function. The tunnel diode amplifier ON-OFF switch is used for placing the unit on-line. In the OFF position, the tunnel diode amplification function is disabled, and the rf signal is passed through without amplification.

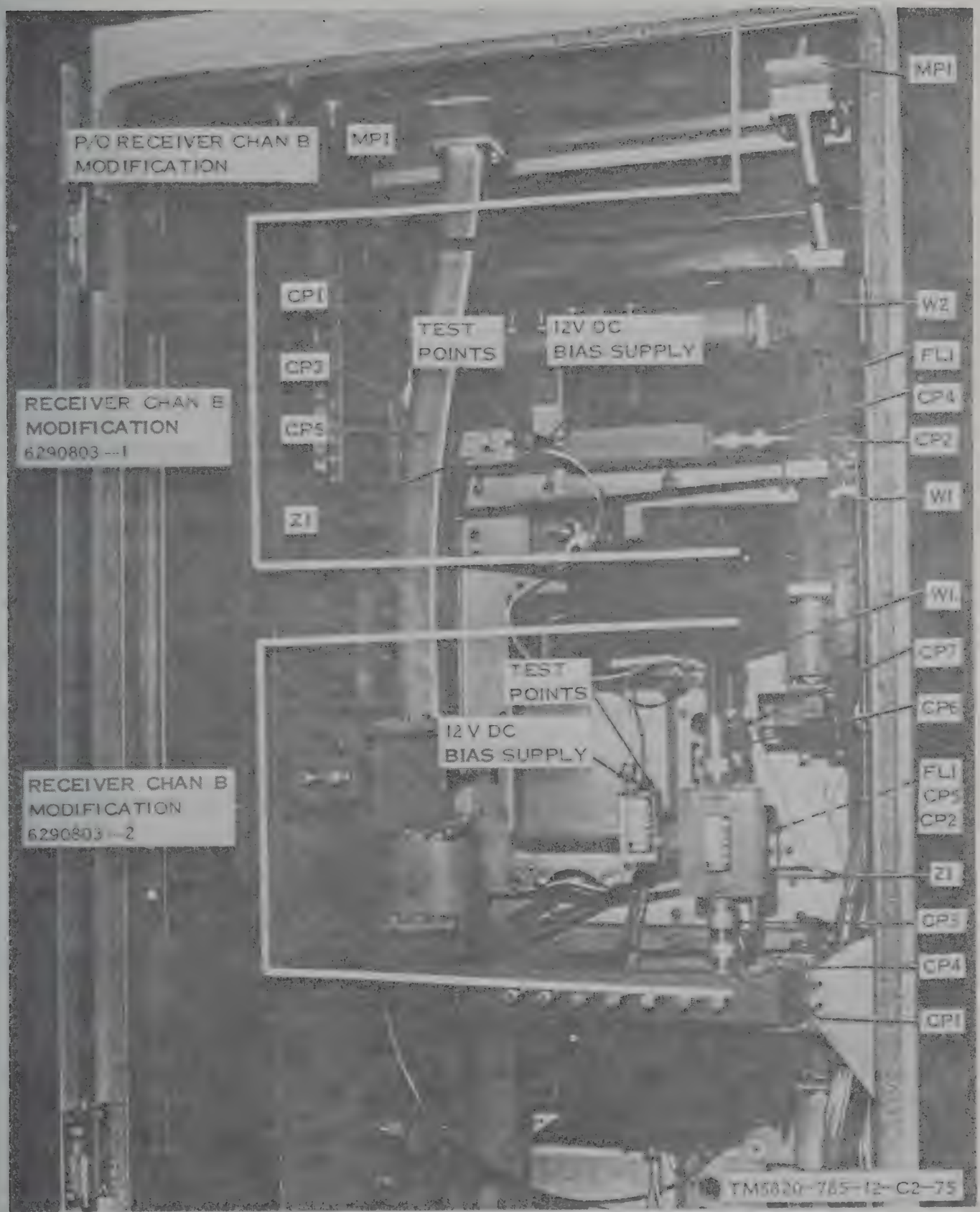


Figure 5–1. Radio Set AN/FRC–80(V) 3, rack rear view location of tunnel diode amplifier assembly 6290803, parts identification.

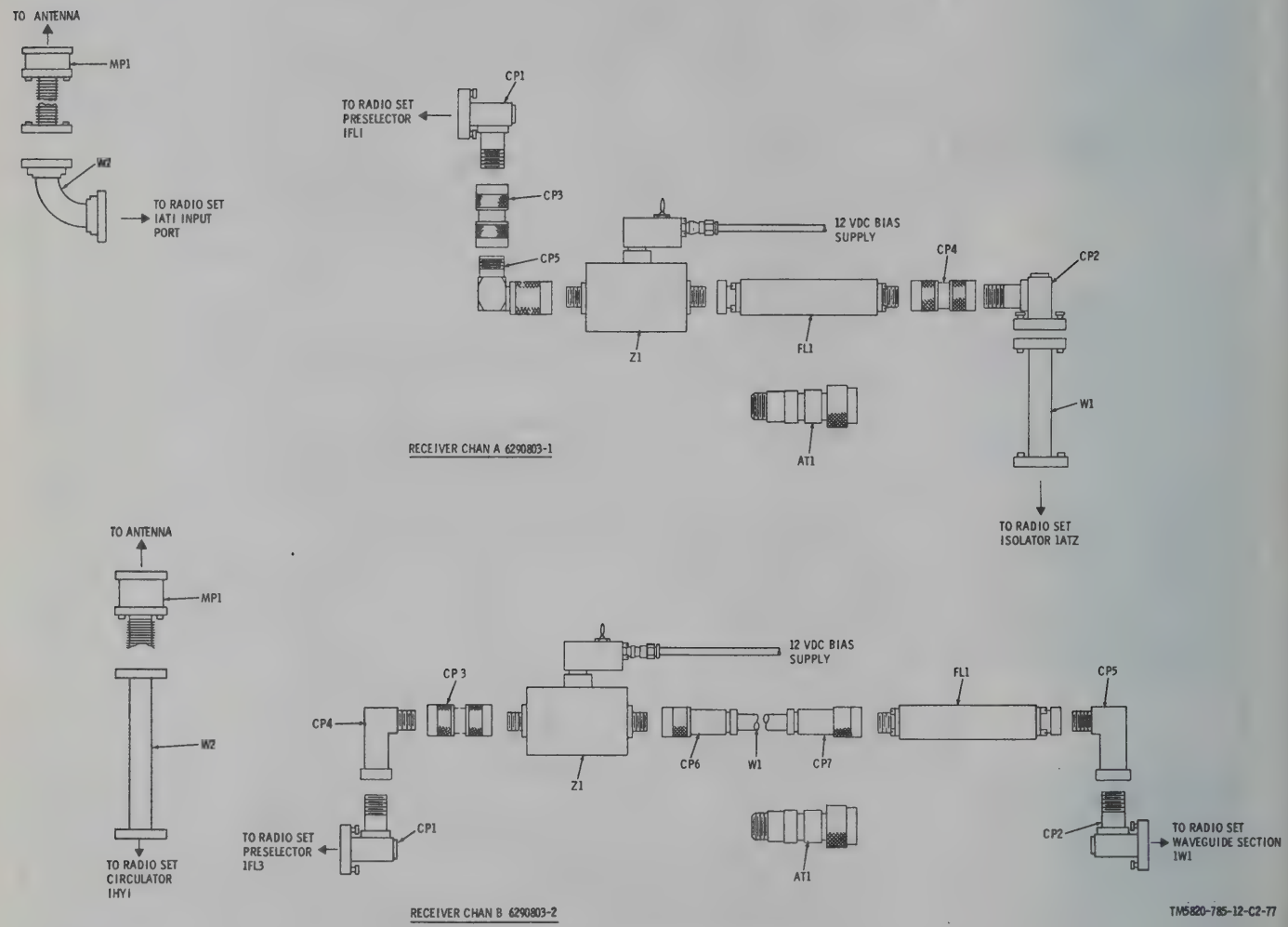


Figure 5–2. Tunnel diode amplifier assembly 6290803, installation diagram.

CHAPTER 6

SHIPMENT, LIMITED STORAGE, AND DEMOLITION TO PREVENT ENEMY USE

Section I. DISASSEMBLY AND REPACKAGING

6-1. Disassembly

Use the following instructions as a guide for preparing the radio set for shipment and limited storage.

WARNING

Make sure primary power source is de-energized before disconnecting primary power leads.

a. Disconnect primary power leads from the radio set.

b. Disconnect the external multiplex input cable.

c. Disconnect the two flexible waveguide sections from the antenna waveguide runs.

d. Disconnect the earth ground strap.

e. Remove the two flexible waveguide sections, harmonic filter 1FL4, and the two rt assembly front access covers from the equipment rack.

f. Dismount and remove the two power converters from the rear of the power supplies.

g. Remove mounting hardware attaching the equipment rack base plate to the floor.

h. Remove the front cover from the klystron oven assembly on both rt assemblies and remove the boiler-waveguide sight glass to drain coolant (distilled water) from the boiler-waveguide (para 4-8*b*). Carefully tip the equipment rack forward a little to drain all the coolant, then replace the sight glass.

6-2. Repackaging

Repackaging of equipment for shipment or limited storage normally will be performed at a packaging facility or by a repackaging team. Should emergency packaging be required, select the materials from those listed in SB 38-100, Preservation, Packaging, and Packing Materials, Supplies, and Equipment Used by the Army. Package the equipment in accordance with the original packaging, so far as possible, with the available materials.

Section II. DEMOLITION TO PREVENT ENEMY USE

6-3. Authority for Demolition

Demolition of the equipment will be accomplished only upon order of the commander. Use the destruction procedures outlined in paragraphs 6-4 and 6-5 below to prevent further use of the equipment.

6-4. Destruction Plan

A plan for destruction of the equipment to prevent enemy use should be established by the local command. All tools, sledge hammers, axes, etc. required to quickly carry out the destruction plan should be located near the equipment. Use the priorities for destruction given in paragraph 6-5 to develop a plan which will most efficiently and quickly render the equipment useless.

6-5. Destruction Priority

When it is necessary to destroy the equipment, it should be completely destroyed, if possible. When time prevents complete destruction, however, establish the following priority for equipment destruction:

a. Transmitter klystron.

b. Transmitter afc reference cavity.

c. Receiver mixer-local oscillator-preamplifier.

d. All waveguides at the rear of the equipment rack.

e. All front panel meters, switches, and controls.

f. Connectors and wiring on rear of equipment.

g. Plug-in assembly printed circuit boards.

h. Power supplies.

i. Remaining equipment.

NOTE

The same priority must be given to destruction of similar component parts in spare parts storage areas.

6–6. Reporting Destruction

The reporting of the destruction of equipment will be made through command channels.

Figure 6–1. Color code marking for MIL–STD resistors, capacitors, and inductors.

(Located in back of manual.)

Figure 6–2. Equipment interconnection and cabling diagram.

(Located in back of manual.)

Figure 6–3. Equipment interconnection and cabling diagram (AN/FRC–80(V)2).

(Located in back of manual.)

Figure 6–4. Equipment interconnection and cabling diagram (AN/FRC–80(V)3).

(Located in back of manual.)

APPENDIX A

REFERENCES

The following publications contain information applicable to the operation and organizational maintenance of Radio Set AN/FRC–80(V)*:

AR 310–25	Dictionary of United States Army Terms.
DA Pam 310–4	Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Supply Manuals (Types 7, 8, and 9), and Lubrication Orders.
DA Pam 310–7	U.S. Army Equipment Index of Modification Work Orders.
SB 11–573	Painting and Preservation Supplies Available for Field Use for Electronics Command Equipment.
SB 38–100	Preservation, Packaging, Packing, and Marking Materials, Supplies, and Equipment Used by the Army.
SC 5180–91–CL–R07	Tool Kit, Electronic Equipment TK–105/G.
TB 746–10	Field Instruction for Painting and Preserving Electronics Command Equipment.
TM 11–5805–570–15	Operator's, Organizational, DS, GS, and Depot Maintenance Manual Including Repair Parts and Special Tool Lists: Interface Equipment Consisting of: Panels, Baseboard Interconnection-Monitor SB–3413/FRC–151(V) thru SB–3416/FRC–151(V) and Panel, Monitor-Alarm SB–3493/FRC–151(V); Interface Unit, Multiplexer MX–8540/FCC; Interface Unit, Multiplex, Hybrid MX–8569/FCC; Network, Impedance Matching TA–841/GT; Converter, Telephone Signal CV–2691/GT; Shelf Assembly, Ringdown Converter SA–1049; Combiner, Diversity CV–2692/GT; Generator, Ringing Static G–68/GR; Pulse Link Repeater TA–846/GT; Shelf Assembly, Pulse Link Repeater SA–1050; Filter, Assembly, Electrical F–1288/FRC; Multiplex Interface Equipment 31559. Baseband Branching Network 31560; Alarm Monitor Panel 6289892–6.
TM 38–750	The Army Maintenance Management Systems (TAMMS).

APPENDIX C

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

C-1. General

This appendix provides a summary of the maintenance operations covered in the equipment literature for AN/FRC-80(V) and RT-987(V)1/FRC. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

C-2. Maintenance Functions

Maintenance functions will be limited to and defined as follows:

a. INSPECT. To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.

b. TEST. To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc. This accomplished with external test equipment and does not include operation of the equipment and operator type tests using internal meters or indicating devices.

c. SERVICE. To clean, to preserve, to charge, and to add fuel, lubricants, cooling agents, and air. If it is desired that elements, such as painting and lubricating, be defined separately, they may be so listed.

d. ADJUST. To rectify to the extent necessary to bring into proper operating range.

e. ALIGN. To adjust two or more components or assemblies of an electrical or mechanical system so that their functions are properly synchronized. This does not include setting the frequency control knob of radio receivers or transmitters to the desired frequency.

f. CALIBRATE. To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparison of two instruments, one of which is a certified standard of known acccuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.

g. INSTALL. To set up for use in an operational environment such as an encampment, site, or vehicle.

h. REPLACE. To replace unserviceable items with serviceable like items.

i. REPAIR. To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes, but is not limited to welding, grinding, riveting, straightening, and replacement of parts other than the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.

j. OVERHAUL. Normally, the highest degree of maintenance performed by the Army in order to minimize time work in process is consistent with quality and economy of operation. It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by maintenance standards in technical publications for each item of equipment. Overhaul normally does not return an item to like new, zero mileage, or zero hour condition.

k. REBUILD. The highest degree of materiel maintenance. It consists of restoring equipment as nearly as possible to new condition in accordance with original manufacturing standards. Rebuild is performed only when required by operational considerations or other paramount factors and then only at the depot maintenance category. Rebuild reduces to zero the hours or miles the equipment, or component thereof, has been in use.

l. SYMBOLS. The uppercase letter placed in

the appropriate column indicates the lowest level at which that particular maintenance function is to be performed.

C-3. Explanation of Format

a. Column 1, group number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies and modules with the next higher assembly.

b. Column 2, functional group. Column 2 lists the noun names of components, assemblies, subassemblies and modules on which maintenance is authorized.

c. Column 3, maintenance functions. Column 3 lists the maintenance category at which performance of the specific maintenance function is authorized. Authorization to perform a function at any category also includes authorization to perform that function at higher categories. The codes used represent the various maintenance categories as follows:

Code	*Maintenance Category*
C	Operator/Crew
O	Organizational Maintenance
F	Direct Support Maintenance
H	General Support Maintenance
D	Depot Maintenance

d. Column 4, tools and test equipment. Column 4 specifies, by code, those tools and test equipment required to perform the designated function. The numbers appearing in this column refer to specific tools and test equipment which are identified in table I.

e. Column 5, Remarks. Self-explanatory.

C-4. Explanation of Format of Table I, Tool and Test Equipment Requirements

The columns in Table I, Tool and Test Equipment Requirements are as follows:

a. Tools and Equipment. The numbers in this column coincide with the numbers used in the tools and equipment column of the Maintenance Allocation Chart. The numbers indicate the applicable tool for the maintenance function.

b. Maintenance Category. The codes in this column indicate the maintenance category normally allocated the facility.

c. Nomenclature. This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

d. Federal Stock Number. This column lists the Federal stock number of the specific tool or test equipment.

e. Tool Number. Not used.

SECTION II. MAINTENANCE ALLOCATION CHART

Nomenclature of End Item or Component	Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1	Radio Set AN/FRC-80(V)1	0											116	Visual
			0										1	Status indication by means of built-in test equipment, visual alarms, audible alarms, meter reading
			F										1,3,13,17,18,24,26, 27,33,34,61,62,64, 69,70	
			H										9,24,31,32,33	
				0									116	Cleaning
					F								1,3,5,13,18,19	System adjustments including - transmitter AFC, combiner AGC, modulation level, combiner gain, receiver calibration level, pilot sensing, squelch and orderwire adjustments.
					H								3,4,40,121	
						H							8,10,11,21,22,23, 24,25,34,72,88,122	Seven section filter assembly alignment in the system

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b	c											d	e
1 (Cont.)	Radio Set AN/FRC-80(V)1							F					116	
									F				116	Replace defective sub-assemblies
										0			116	Replace knobs, lights, etc.
											D		1 - 116	Restore to serviceable condition
1A1	Receiver-Transmitter, Radio RT-986(P)/FRC	0												Visual
			0											Status indication by means of built-in test equipment, visual alarms, meter readings
				0										Cleaning
					F									Peaking by means of built-in test equipment
										0			116	Replace knobs, lights, etc.
										F			116	

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1A1A1	Limiter, Electrical Noise CN-1317/FRC		H										1,6,7,13,14,16,44, 51,57,89,93,94,103, 134,143,144,145	Bench Test
									F					Based on testing
										H			116	Replace piece parts
1A1A2	Control, Receiver C-8434/FRC		H										6,7, 10,11,16,36,42, 44,46,52,54,71,72, 92,95,96,97,108, 109,110,111,115, 146,147	Bench test
									F					Based on testing
										H			116	Replace piece parts
1A1A3	Control, Klystron C-8435/FRC		H										3,5,6,7,10,11,16, 28,29,42,44,46,49, 55,73,88,89,90,160	Bench test
									F					Based on testing
										H			116	Replace piece parts

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1A1A4	Amplifier-Modulator AM-6262/FRC		H										1,3,4,5,6,13,17,42, 43,45,51,54,89,93, 94,139,145	Bench test
									F					Based on testing
										H			116	Replace piece parts
1A1A5	Amplifier-Demodulator AM-6261/FRC								F					Factory repair. See SB11-497
1A1A6	Equalizer, Time Delay CN-1320/FRC								F					Factory repair. See SB11-497
1A1A9	Waveguide Assembly 01-86631C01													Replace waveguide sections
1A1A9A1	Detector, Frequency Monitor 01-85484C02								0				116	Visual
									F				116	
1A1A9AT1	Isolator, Radio Freq Reflection 58-85480C03								0				116	Visual
									F				116	
1A1A9DC1	Coupler, Frequency Monitor 01-85482C04								0				116	Visual
									F				116	

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c										Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild	
a	b												d	e
1A1A9W1	Boiler Assembly 58-86394C01								0				116	Visual
									F				116	
1A1A9Z1	Cavity, Tuned, Reference 01-85483C03								F				116	Based on testing
						H							8,10,11,20,24,25,28, 29,34,39,129,130,131	Bench test
1A1A9Z2	Cavity, Tuned, Linearized 01-85726C03								F				116	Based on testing
										H			116	Restore to serviceable condition
						H								In system
1A1A7	Mixer-Local Osc-Preamplifier 01-85485C04				F									Varactor, oscillator and mixer adjustment using built-in test equipment in system
									F					Based on testing
										H			116	Replace piece parts
					H								3,6,16,25,28,29,34, 39,71,72,75,93,118, 132,133,134,135,136, 137,138,139,140,141, 142,143	Bench alignment

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1A1A7A1	Local Oscillator 01-88988B02				F									Built-in test equipment
									H				116	Bench test
										H			116	Replace piece parts
1A1A7A2	Amplifier, Intermediate Freq 01-85338C01								H				116	Based on testing
										H			116	Replace piece parts
1A1A7A3	Waveguide Assembly, Mixer Lo 58-85730C01								H				116	Based on testing
										H			116	Replace piece parts
1AT5	Isolator, Radio Freq, Reflection 58-87341B06								0				116	Visual
									F				116	
1AT3	Waveguide and Tuning Assembly 01-86438C01								F				116	Based on testing
					F								116	In system
1AT6	Waveguide and Tuning Assembly 01-86438C01													Same as group number 1AT3
1W1	Waveguide, Spacer, H-Bend 01-86438C01								F				116	Based on testing

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1FL1	Seven Section Filter Assembly 01-86390C04								F				116	Based on testing
						H							8,10,11,20,21,23,24, 25,34,123,124,125, 126	Bench alignment
1AT1	Isolator, Radio Freq Reflection 58-87341B06								F				116	Isolators 1AT1 and 1AT2 are mated with seven section filter assembly 1FL1 during bench alignment and are replaced with the seven section filter assembly
1AT2	Isolator, Radio Freq Reflection 58-87341B06								F				116	Same remarks as above
1A9	Waveguide Assembly, Transmitter 01-85740C02								F				116	Based on testing
										H			116	Replace piece parts
						H							1,8,10,11,16,20,21 22,23,24,34,117,123, 124,125,126,127	Bench alignment

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
	Receiver Filter Circulator consisting of:								F				116	Receiver filter circulator consisting of seven section filter assembly 1FL3, circulator 1HY1, isolator 1AT4, and filter 1FL2 are mated during bench alignment and are installed in the system as matched parts.
						H							8,10,11,20,21,23, 24,25,34,123,124, 125,126	Bench alignment
1FL3	Seven Section Filter Assembly 01-86389C02								H				116	Receiver filter circulator consisting of seven section filter assembly 1FL3, circulator 1HY1, isolator 1AT4, and filter 1FL2 are mated during bench alignment and are installed in the system as matched parts.
1HY1	Waveguide-Circulator 58-85736C02								H				116	Same as remarks above

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1AT4	Isolator-Waveguide 58-87341B06								H				116	Same as remarks above
1FL2	Filter Assembly 01-86392C02								H				116	Same as remarks above
None	Control Panel MU573-SP1	0											116	Visual
			0											Replace hose or condenser
			F										1	
									F					Replace piece parts
None	Control Panel MU573-SP2													Same as Control Panel MU573-SP1
1A1MP20	Oven Assembly 01-85412C01	0											116	Visual
			0											Check coolant level
			F											
				0										Replenish coolant
									F					Visual
1A1A8	Condenser, Steam, Surface 01-86630C01	0											116	Visual leakage

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1A1A8 (Cont.)	Condenser, Steam, Surface 01-86630C01			0										Replenish coolant, clean cooling ribs
									F				116	Replace hose or condenser
1A2	Power Supply Set 01-86628C01 consisting of the following Group Numbers 1A2A1, 1A2A1A1 and 1A2A2:													
1A2A1	Power Supply PP-6414/FRC	0											116	Visual
			0											Built-in test equipment
			H										2,3,7,12,47,50,115, 116	
				0									116	Cleaning
										F			116	Replace lamps
										H			116	

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1A2A1A1	Comparator-Control C-8437/FRC		H											Bench tested in power supply 1A2A1
									H					Based on testing
										H			116	Replace piece parts
1A2A2	Power Supply PP-6413/FRC	0											116	Visual
			F										1	Voltage and continuity tests
			H										1,3,14,35,37,38, 102,148,149,150, 151,152,153,154, 155,156	
									0					Visual
									F					
										H			116	Replace piece parts
1A3	Sensing and Control Shelf Assy 01-86629C01	0											116	Visual

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1A3 (Cont.)	Sensing and Control Shelf Assy 01-86629C01		0										1	Voltage and continuity tests
				0										Cleaning
										F				Replace piece parts
1A3A1	Control, Transmitter C-8427/FRC		H										1,3,5,6,7,12,14,16, 42,44,46,80,91,92, 97,148,157,158,159	Bench test
									F					Based on testing
										H			116	Replace piece parts
1A3A8	Control, Transmitter C-8427/FRC													Same as group number 1A3A1
1A3A2	Monitor, Transmitter-Receiver ID-1696/FRC		H										1,3,5,6,7,14,16,44, 53,80,91,92,97,148, 157,159	Bench test
									F					Based on testing
										H			116	Replace piece parts

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1A3A3	Monitor, Transmitter-Receiver ID-1696/FRC													Same as group number 1A3A2
1A3A6	Monitor, Transmitter-Receiver ID-1696/FRC													Same as group number 1A3A2
1A3A7	Monitor, Transmitter-Receiver ID-1696/FRC													Same as group number 1A3A2
1A3A4	Amplifier, Audio Frequency-Radio Frequency AM-6264/FRC		H										1,2,3,6,9,13,15,44, 51,53,89,94,107,115, 127,145	
									F					Based on testing
										H			116	Replace piece parts
1A3A5	Amplifier, Audio Frequency-Radio Frequency AM-6264/FRC													Same as group number 1A3A4
1A3A9	Control, Transmitter Transfer C-8436/FRC		H										6,7,16,36,44,46,83, 99,100,101,113,127, 161,164,165,166	
									F					Based on testing
										H			116	Replace piece parts

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1A7	Panel, Combiner Bypass and Alarm SB-3428/FRC	0											116	Visual
			0											Built-in test equipment
			F										1	
									F				116	Based on testing
										H			116	Replace piece parts
1A7A1	Monitor, Transmitter-Receiver ID-1696/FRC													Same as group number 1A3A2
1A7A2	Monitor, Transmitter-Receiver ID-1696/FRC													Same as group number 1A3A2
1A7A3	Monitor, Transmitter-Receiver ID-1696/FRC													Same as group number 1A3A2
1A4	Receiver-Transmitter, Radio RT-986(P)/FRC													Same as group number 1A1
1A5	Power Supply Set													Same as group number 1A2

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1A6	Receiver-Transmitter, Order Wire RT-987(V)1/FRC	0											116	Visual
			0											Operational test
				0									116	Cleaning
					F									Station adjustment, system adjustment
									F				116	
	Chassis, Electrical Equipment, Rack Mounted CH-650/FRC	0											116	Visual
			F										1	Voltage and continuity tests
										F			116	Replace piece parts
1A6A1	Receiver, Order Wire R-1661/FRC		H										3,5,6,7,10,11,30, 42,44,73,74,75,76, 89,119,169	
									F					Based on testing
										H			116	Replace piece parts

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1A6A2	Transmitter, Order Wire T-1162/FRC		H										1,3,5,6,7,10,11,16, 30,44,49,55,68,74, 81,82,83,89,102, 167	Bench test
									F					Based on testing
										H			116	Replace piece parts
1A6A3	Signalling Unit, Order Wire TA-842/FRC		H										1,3,6,7,13,28,29, 44,50,72,77,86,97, 144	
									F					Based on testing
										H			116	Replace piece parts
1A6A4	Coupler, Order Wire-Telephone Circuits CU-1912/FRC		H										3,5,7,84,170	Bench test
									F					Based on testing
										H			116	Replace piece parts

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1A6A5	Indicator-Direct Current Combiner ID-1701/FRC								0					Visual
			H										1	Bench test
									F					
										H			116	Replace piece parts
	Monitor Panel, Telephone TA-844/FRC	0											116	Visual
			F										1	Voltage and continuity tests
									F				116	Replace piece parts
1A6A7	Handset H-303/U	0											116	Visual
			F										1	Voltage and continuity tests
									F				116	Replace piece parts

TABLE I. TOOL AND TEST EQUIPMENT REQUIREMENTS

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
1	O,F,H,D	Multimeter, AN/USM-210	6625-019-0815	
2	H,D	Differential Voltmeter, ME-202/U	6625-050-8686	
3	F,H,D	A.C. VTVM, ME-318/U	6625-727-4706	
4	H,D	Attenuator, Daven 651-73	6625-476-0515	
5	F,H,D	Oscillator, O-1025/U or AN/URM-27		
6	H (2 ea) D (2 ea)	Dual Power Supply, HP DPR6255A	6130-065-6811	
7	H,D	Test Fixture, FEC 6289926		
8	H,D	Sweep Generator, HP H01-694D	6625-947-7492	
9	F,H,D	R.F. Voltmeter, AN/URM-145	6625-973-3986	
10	H,D	Oscilloscope, Tektronix 545	6625-799-7956	
11	H,D	Oscilloscope Plug-In Unit, AM-3174/U		
12	H,D	Test Jig, FEC 6289927		
13	F,H,D	Test Oscillator, SG-553/U	6625-778-9672	
14	H,D	D.C. VTVM, ME-266/USM-183	6625-720-3537	
15	H,D	V.H.F. Signal Generator, SG-309	6625-538-9879	
16	H,D	Power Supply, HP6206B	6625-823-5359	

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
17	F,D	White Noise Test Set, AN/GSM-161		
		60 HKz HP Filter, F-1077/GSM		
		1300 KHz LP Filter, Marconi TM-7720/3		
		70 KHz BS Filter, F-1067/GSM	5915-939-5849	
		534 KHz BS Filter, F-1071/GSM	5915-829-1520	
		1248 KHz BS Filter, Marconi TM-7729/7		
		70 KHz BP Filter, F-1073/GSM	5915-762-2399	
		534 KHz BP Filter, F-1076/GSM	5915-829-1528	
		1248 KHz BP Filter, Marconi TM-7730/7		
		70 KHz Oscillator, O-1317/GSM	6625-921-0499	
		534 KHz Oscillator, O-1321/GSM		
		1248 KHz Oscillator, Marconi TM-7795		
18	F,D	Selective Voltmeter, Sierra 127C	6625-935-4206	
19	H,D	Deviation Calibrator, Motorola MU140-70		
20	H,D	Double Stub Tuner, Narda 903N		
21	H,D	Wavemeter, HP H532A	6625-730-8570	
22	H (1 ea) D (2 ea)	Directional Coupler, HP H752D	5985-583-9428	
23	H (2 ea) D (2 ea)	Detector Mount, HP 485B	6625-337-8355	
24	F (1 ea) H (1 ea) D (4 ea)	Waveguide Attenuator, CN-928/TRT		

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
25	H,D (3 ea)	Isolator, Motorola 58-85480C02		
26	F,D	Power Meter, AN/USM-260	6625-917-3099	
27	F,D	Thermistor Mount, MX-2144A/U	6625-519-2414	
28	F,H,D	Frequency Counter, CP-772/U		
29	F,H,D	Frequency Converter, HP5255A	6625-058-3042	
30	H,D	Distortion Meter, TS-723A/U	6625-668-9418	
31	F,D	Noise Source, SG-337/U	6625-730-6918	
32	F,D	Attenuator, CN-796/U	5985-831-5991	
33	H,D (3 ea)	Waveguide Adapter, UG-51/U to 1477/U, Motorola 58C86723C01		
34	F (1 ea) H (2 ea) D (2 ea)	Waveguide Coax Adapter, UG-1054/U		
35	H,D	Variable Transformer, GR W10MT3A	6120-054-7794	
36	F,H,D	Electronic Multimeter, ME-26A/U	6625-360-2493	
37	H,D	A.C. Ammeter, ME-156/U	6625-620-1405	
38	H, D	A.C. Voltmeter, AN/PSM-3 or ME-30E/U		
39	F	Signal Generator, AN/URM-44 or AN/URM-44A	6625-990-7700	

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
40	H,D	Microwave Link Analyzer, HP3701A/02A/03A		
41	D	Noise Measuring Set, NE TTS-37B	6625-918-5781	
42	H (6 ea) D (6 ea)	Test Cable, Pomona B-4		
43	H (2 ea) D (2 ea)	Test Cable, Pomona B-8		
44	H (7 ea) D (7 ea)	Test Cable, Pomona B-24		
45	H,D	Test Cable, Pomona AL-B-24		
46	H,D	Test Cable, Pomona 1166-24		
47	H (2 ea) D (2 ea)	Test Cable, Pomona 1368-A-36		
48	D (2 ea)	Test Cable, Pomona 2BC-BNC-36		
49	H (2 ea) D (2 ea)	Test Cable, Pomona 2241-C-24		
50	H (3 ea) D (3 ea)	Test Cable, Pomona 2241-C-36		
51	H (5 ea) D (5 ea)	Test Cable, Pomona 2885		
52	H (2 ea) D (2 ea)	Test Cable, Pomona 1166-12		

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
52	H (2 ea) D (2 ea)	Test Cable, Pomona 1166-12		
53	H (3 ea) D (3 ea)	Test Cable, Pomona 2BC-MG-36		
54	H,D	Test Cable, Pomona AL-C-BNC-18		
55	H (2 ea) D (2 ea)	Test Cable, Pomona AL-C-BNC-24		
56	D (5 ea)	Test Cable, Pomona BNC-C-36		
57	H, D	Test Cable, Pomona 1152-C-12		
58	F,H,D	Test Cable, Pomona 2739-C-48		
59	D(2 ea)	Test Cable, Pomona 2BC-BNC-12		
60	F (2 ea)	Test Cable, Pomona 2174-36		
61	F (2 ea) D (2 ea)	Test Cable, HP11001A	4935-724-9599	
62	F (2 ea) H (2 ea) D (2 ea)	Test Cable, HP10503A	6150-617-1470	
63	F (1 ea) H (3 ea) D (3 ea)	Test Cable, HP11500A	5995-686-4683	
64	F,D	Test Cable, HP11035A	4935-686-5463	
65	F (2 ea) H (6 ea) D (6 ea)	Test Cable, Pomona BNC-E-36		

Nomenclature of End Item or Component	Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)			
Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
66	F	Test Cable, Pomona 2BC-PP-36		
67	D (2 ea)	Test Cable, HP11000A	5995-986-3323	
68	H,D	Test Cord, Pomona 1368-A-24		
69	F,H,D	Test Adapter, UG-274		
70	F (1 ea) H (1 ea) D (2 ea)	BNC Termination, 75 Ohms Amphenol 46650-75		
71	H (2 ea) D (2 ea)	Variable Resistor, 2500 Ohms, 2W, Clarostat 43C2-2500		
72	F (1 ea) H (2 ea) D (2 ea)	Resistor, 100K Ohms, 1/2 W, 5%, RC20GF104J	5905-195-6761	
73	H (2 ea) D (2 ea)	Resistor, 4700 Ohms, 0.5W, 5%, RC20GF472J	5905-279-3501	
74	H (2 ea) D (2 ea)	Resistor, 39 Ohms, 0.5W, 5%, RC20GF390J	5905-195-5546	
75	H,D	Resistor, 470 Ohms, 0.5W, 5%, RC20GF471J	5905-991-8595	
76	H,D	Resistor, 4700 Ohms, 2W, 5%, RC42GF472J	5905-257-0937	
77	H,D	Resistor, 27000 Ohms, 0.5W, 5%, RC20GF273J	5905-279-3499	
78	H,D	Resistor, 12 Ohms, 200W, 5%, RW47V120F		

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
79	H,D	Resistor, 432 Ohms, 1/2W, 1%, RN65D4320F	5905-763-4370	
80	H,D	Resistor, 10 Ohms, 1/2W, 5%, RC20GF100J	5905-190-8883	
81	H,D	Resistor, 130 Ohms, 5W, 5%, RW55G131F		
82	H,D	Resistor, 3900 Ohms, 0.5W, 5%, RC20GF392J	5905-279-3505	
83	H (2 ea) D (2 ea)	Resistor, 2700 Ohms, 1/2W, 5%, RC20GF272J	5905-279-1880	
84	F	Resistor, 604 Ohms, 0.5W, 1%, RN65D6040F	5905-984-3221	
85	H,D	Resistor, 1000 Ohms, 0.5W, 1%, RN65D1001F	5905-883-9198	
86	H,D	Resistor, 5600 Ohms, 1/4W, 1%, RN60D5601F		
87	H,D	Resistor, 56K Ohms, 1/2W, 5%, RC20GF563J	5905-171-1986	
88	H,D	Resistor, 56 Ohms, 1/2W, 5%, RC20GF560J		
89	H (3 ea) D (3 ea)	Resistor, 560 Ohms, 1/2W, 5%, RC20GF561J	5905-195-6800	
90	H (2 ea) D (2 ea)	Resistor, 1M Ohms, 1/2W, 5%, RC20GF105J	5905-925-7182	
91	H,D	Resistor, 820 Ohms, 2W, 5%, RC42GF821J	5905-279-2286	
92	H,D	Resistor, 2200 Ohms, 1W, 5%, RC32GF222J	5905-279-1723	

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
93	F (2 ea) H (2 ea) D (2 ea)	Resistor, 75 Ohms, 1/2W, 1%, RN65D75R0J		
94	H,D	Resistor, 82 Ohms, 1/2W, 5%, RC20GF820J	5905-279-1894	
95	H,D	Resistor, 18K Ohms, 1/2W, 5%, RC20GF183J	5905-107-5286	
96	H,D	Resistor, 33K Ohms, 1/2W, 5%, RC20GF333J	5905-171-1998	
97	H (3 ea) D (3 ea)	Resistor, 1K Ohms, 1/2W, 5%, RC20GF102J	5905-195-6806	
98	H (2 ea) D (2 ea)	Resistor, 33 Ohms, 5W, 5%, RW55G330F		
99	H (2 ea) D (2 ea)	Resistor, 18 Ohms, 1/2W, 5%, RC20GF180J	5905-279-1753	
100	H (2 ea) D (2 ea)	Resistor, 1 Ohm, 3W, 5%, RW59V1R0F		
101	H (2 ea) D (2 ea)	Resistor, 3300 Ohms, 1/2W, 5%, RC20GF332J	5905-991-8596	
102	H,D	Resistor, 10K Ohms, 1/2W, 5%, RC20GF103J	5905-107-6530	
103	H,D	Resistor, 390 Ohms, 1W, 5%, RC32GF391J	5905-959-9723	
104	H,D	Resistor, 1240 Ohms, 1/2W, 1%, RN65D1241F		
105	H,D	Resistor, 220 Ohms, 1/2W, 5%, RC20GF221J		

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
106	H,D	Resistor, 270K Ohms, 1/2W, 5%, RC20GF274J	5905-190-8865	
107	F	Resistor, 75 Ohms, 0.5W, 1%, RN65D75R0F		
108	H,D	Capacitor, .047 ufd, 200v, CP05A1KC473K3	5910-819-5745	
109	H,D	Capacitor, .001 ufd, 200v, CP05A1KC102K3		
110	H,D	Capacitor, 51 pfd, 200v, Elmenco DM5-510J		
111	H,D	Capacitor, 2 pfd, 200v, Elmenco DM5-020A		
112	H (2 ea) D (2 ea)	Capacitor, .25 ufd, 200v, Sprague 2TMP25		
113	H (2 ea) D (2 ea)	Diode 1N4002	5961-880-4783	
114	F (2 ea)	Adapter, Pomona 1469		
115	H,D	Power Supply, HP6267A	6625-990-3200	
116	O,F,H,D	Tool Kit, Electronic Equipment, TK-105/G	5180-610-8177	
117	F,H,D	W.G. Termination HPH910A	5985-888-5511	
118	H	Iris, Waveguide, FEC 6290451		
119	H	Capacitor, 3 PF, 500 WVDC, CDE CD6CD030C03		
120	H,D	Resistor, 600 Ohms, 1/2W, 1%, RN70D6000F		
121	F,H,D	High Pass Filter, Hertz HP-7907-1		

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
122	F,H,D	Diode, 1N23C		
123	H, D	Slotted Section CG-1106/U, P/O AN/USM-37A, B or D		
124	H,D	Carriage MX-1545/USM-37, P/O AN/USM-37A, B or D		
125	H,D	Probe MX-1546/USM-37, P/O AN/USM-37, A, B or D		
126	H,D	SWR Meter ME-339/U or AN/USM-37A, B or D		
127	H,D	Resistor, 150 Ohms, 2W, 5%, RC42GF151J (3 required)		
128	F,H,D	Directional Coupler (3 db) HPH752A	5985-679-0630	
129	H, D	Coax Detector HP 420A	4935-583-1526	
130	H,D	"T" Connector, "N" Type, UG-28A/U		
131	H,D	60 db Isolator, Spare 1AT1, Motorola 58-87341B06		
132	H,D	Fuse, 1/4 Amp (3 required)		
133	H,D	Connector Cannon DEM-9S		
134	H,D	Low Pass Filter, Motorola 24-89660A01		
135	H, D	Capacitor, 8600 PF, 100 VDC, CDE WMF-1D68		
136	H,D	Resistor, 1800 Ohms, 1/2W, 5%, RC20GF182J		
137	H,D	Switch, Rotary, Spare 1A1S4, Motorola 40-35392B01		

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
138	H,D	Meter, 50-0-50 ua (25-0-25 Scale), Spare 1A1M2, Motorola 72-88702B01		
139	H,D	Resistor, 110 Ohms, 1/2W, 5%, RC20GF111J		
140	H,D	Resistor, 910 Ohms, 1/2W, 5%, RC20GF911J		
141	H,D	Capacitor, 0.01 UF 100 WVDC, CDE WMF-1S1		
142	H,D	Switch, Toggle, DPDT, Cutler Hammer 8680K1		
143	H,D	Meter, 0-200 ua (0-10 Scale), Spare 1A1M1, Motorola 72-88703B01		
144	H,D	AC VTVM AN/USM-106		
145	H,D	Module Test Jig, FEC 6290453		
146	H,D	Resistor, 15K, 1/2W, 5%, RC20GF153J (2 required)		
147	H,D	Switch, Rotary, 6-position, Grayhill 24001-6		
148	H,D	Switch, Toggle, SPST Cutler Hammer 7321K2 (3 required)		
149	H,D	Resistor, 3 Ohms, 25W Ohmite 270-25-3 (2 required)		
150	H, D	Resistor, 5 Ohms, 200W Ohmite 270-225-5 (2 required)		
151	H,D	Resistor, 10 Ohms, 200W, Double Tapped, Ohmite 210-225-10		
152	H, D	Fuse, 4 Amp, 150V		
153	H,D	Lamp, Neon, NE-51		
154	H,D	Connector, US Components 990-18F with Hood		

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)1 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont.)

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
155	H,D	Connector, US Components 990-18M with Hood		
156	H,D	Capacitor, 2000 UF, 50VDC, Mallory CG23450C1		
157	H,D	Battery, 1.5V (D Cell)		
158	H,D	Resistor, Variable, 100 Ohms, 1/2W, Ohmite ASM6661		
159	H,D	Resistor, 10 Ohms, 1/2W, 5%, RC20GF100J		
160	H,D	Resistor, 22K, 1/2W, 5%, RC20GF223J		
161	H,D	Resistor, 680 Ohms, 1/2W, 5%, RC20GF681J		
164	H,D	Resistor, 68 Ohms, 2W, 5%, RC20GF680J		
165	H, D	Resistor, 3.3 Ohms, 1W, 5%, RC32GF3R3J (6 required)		
166	H,D	Lamp, 28V @ 40 ma, GE Type 387		
167	H,D	Resistor, 270 Ohms, 2W, 5%, RC42GF271J		
169	H,D	Transformer Motorola 25-85423B03		
170	H,D	Resistor, 3000 Ohms, 1/2W, 1%, RN70D3001F		

APPENDIX C.1

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

C.1-1. General

This appendix provides a summary of the maintenance operations covered in the equipment literature for AN/FRC-80(V)2 and RT-987(V)1/FRC. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

C.1-2. Maintenance Functions

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.

b. Test. To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc. This is accomplished with external test equipment and does not include operation of the equipment and operator type tests using internal meters or indicating devices.

c. Service. To clean, to preserve, to charge, and to add fuel, lubricants, cooling agents, and air. If it is desired that elements, such as painting and lubricating, be defined separately, they may be so listed.

d. Adjust. To rectify to the extent necessary to bring into proper operating range.

e. Align. To adjust two or more components or assemblies of an electrical or mechanical system so that their functions are properly synchronized. This does not include setting the frequency control knob of radio receivers or transmitters to the desired frequency.

f. Calibrate. To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.

g. Install. To set up for use in an operational environment such as an encampment, site, or vehicle.

h. Replace. To replace unserviceable items with serviceable like items.

i. Repair. To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes, but is not limited to welding, grinding, riveting, straightening, and replacement of parts other than the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.

j. Overhaul. Normally, the highest degree of maintenance performed by the Army in order to minimize time work in process is consistent with quality and economy of operation. It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by maintenance standards in technical publications for each item of equipment. Overhaul normally does not return an item to like new, zero mileage, or zero hour condition.

k. Rebuild. The highest degree of materiel maintenance. It consists of restoring equipment

as nearly as possible to new condition in accordance with original manufacturing standards. Rebuild is performed only when required by operational considerations or other paramount factors and then only at the depot maintenance category. Rebuild reduces to zero the hours or miles the equipment, or component thereof, has been in use.

l. Symbols. The uppercase letter placed in the appropriate column indicates the lowest level at which that particular maintenance function is to be performed.

C.1-3. Explanation of Format

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Functional Group. Column 2 lists the noun names of components, assemblies, subassemblies, and modules on which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the maintenance category at which performance of the specific maintenance function is authorized. Authorization to perform a function at any category also includes authorization to perform that function at higher categories. The codes used represent the various maintenance categories as follows:

Code	*Maintenance category*
C	Operator/crew
O	Organizational maintenance
F	Direct support maintenance
H	General support maintenance
D	Depot maintenance

d. Column 4, Tools and Test Equipment. Column 4 specifies, by code, those tools and test equipments required to perform the designated function. The numbers appearing in this column refer to specific tools and test equipment which are identified in table I.

e. Column 5, Remarks. Self-explanatory.

C.1-4. Explanation of Format of Table I, Tool and Test Equipment Requirements

The columns in table I are as follows:

a. Tools and Equipment. The numbers in this column coincide with the numbers used in the tools and equipment column of the maintenance allocation chart. The numbers indicate the applicable tool for the maintenance function.

b. Maintenance Category. The codes in this column indicate the maintenance category normally allocated the facility.

c. Nomenclature. This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

d. Federal Stock Number. This column lists the Federal stock number of the specific tool or test equipment.

e. Tool Number. Not used.

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1A1A9W1	Boiler Assembly 58-86394C01								0				104	Visual
									F				104	
1A1A9Z1	Cavity, Tuned, Reference 01-85483C03								F				104	Based on testing
						H							7,9,10,20,24,26,29, 30,35,40,117,118,119,	Bench test
1A1A9Z2	Cavity, Tuned, Linearized 01-85726C03								F				104	Based on testing
										H			104	Restore to serviceable condition
						H								In system
1A1A7	Mixer-Local Osc-Preamplifier 01-85485C04				F									Varactor, oscillator and mixer adjustment using built-in test equipment in system
									F					Based on testing
									H				104	Replace piece parts
1A1A7					H								3,6,15,26,29,30,35, 40,62,63,66,84,106, 120 through 131	Bench Alignment

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1(cont.)	Radio Set AN/FRC-80(V)2							F					104	
									F				104	Replace defective sub-assemblies
										0			104	Replace knobs, lights, etc.
											D		1 - 172	Restore to serviceable condition
1A1	Receiver-Transmitter, Radio RT-986(P)/FRC	0												Visual
			0											Status indication by means of built-in test equipment, visual alarms, meter readings
				0										Cleaning
					F									Peaking by means of built-in test equipment
										0			104	Replace knobs, lights, etc.
										F			104	

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1A1A1	Limiter, Electrical Noise CN-1317/FRC		H										1,6,12,13,15,44,50, 80,84,85,94,122,131 132,133,165,166	Bench Test
									F					Based on testing
										H			104	Replace piece parts
1A1A2	Control, Receiver C-8434/FRC		H										6,9,10,15,37,42,44, 46,62,63,83,86,87,96 97,98,99,103,134,135 165,166,133	Bench test
									F					Based on testing
										H			104	Replace piece parts
1A1A3	Control, Klystron C-8435/FRC		H										3,5,6,9,10,15,29,30, 42,44,46,48,64,79, 80,81,133,150	Bench test
									F					Based on testing
										H			104	Replace piece parts

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1FL1	Seven Section Filter Assembly 01-86390C04								F				104	Based on testing
						H							7,9,10,20,21,23,24, 26,35,111,112,113, 114	Bench alignment
1AT1	Isolator, Radio Freq Reflection 58-87341B06								F				104	Isolators 1AT1 and 1AT2 are mated with seven section filter assembly 1FL1 during bench alignment and are replaced with the seven section filter assembly
1AT2	Isolator, Radio Freq Reflection 58-87341B06								F				104	Same remarks as above
1A9	Waveguide Assembly, Transmitter 01-85740C02								F				104	Based on testing
										H			104	Replace piece parts
						H							1,7,9,10,15,20,21, 22,23,24,35,105,111, 112,113,114,115	Bench alignment

SECTION II. MAINTENANCE ALLOCATION CHART

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1	Radio Set AN/FRC-80(V)2	0											104	Visual
			0										1	Status indication by means of built-in test equipment, visual alarms, audible alarms, meter reading
			F										1,3,12,16,17,24,27, 28,34,35,53,54,56,57, 60,61,80,161,164,168	
			H										8, 24, 32, 33, 34	
				0									104	Cleaning
					F								1,3,4,12,17,18,19,40, 55,60,116	System adjustments including - transmitter AFC, combiner AGC, modulation level, combiner gain, receiver calibration level, pilot sensing, squelch and orderwire adjustments.
					H								3,4,41,109	
						H							7,9,10,21,22,23,24, 26,35,63,79,110	Seven section filter assembly alignment in the system

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1A1A7A1	Local Oscillator 01-88988B02				F									Built-in test equipment
									H				104	Bench test
										H			104	Replace piece parts
1A1A7A2	Amplifier, Intermediate Freq 01-85338C01								H				104	Based on testing
										H			104	Replace piece parts
1A1A7A3	Waveguide Assembly, Mixer LO 58-85730C01								H				104	Based on testing
										H			104	Replace piece parts
1AT5	Isolator, Radio Freq, Reflection 58-87341B06									0			104	Visual
										F			104	
1AT3	Waveguide and Tuning Assembly 01-86438C01									F			104	Based on testing
					F								104	In system
1AT6	Waveguide and Tuning Assembly 01-86438C01													Same as group number 1AT3

Nomenclature of End Item or Component Radio Set AN/FRC-30(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1W1	Waveguide, Spacer, H-Bend 01-86438C01								F				104	Based on testing

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1A1A4	Amplifier-Modulator AM-6262/FRC		H										1,3,4,5,6,12,16,42, 43,45,50,80,84,85, 128,133,161,163,165, 166,167	Bench test
									F					Based on testing
										H			104	Replace piece parts
1A1A5	Amplifier-Demodulator AM-6261/ FRC								F					Factory repair. See SB11-497
1A1A6	Equalizer, Time Delay CN-1320/ FRC								F					Factory repair. See SB11-497
1A1A9	Waveguide Assembly 01-86631C01													Replace waveguide sections
1A1A9A1	Detector, Frequency Monitor 01-85484C02								0				104	Visual
									F				104	
1A1A9AT1	Isolator, Radio Freq Reflection 58-85480C03								0				104	Visual
									F				104	
1A1A9DC1	Coupler, Frequency Monitor 01-85482C04								0				104	Visual

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
	Receiver Filter Circulator consisting of:								F				104	Receiver filter circulator consisting of seven section filter assembly 1FL3, circulator 1HY1, isolator 1AT4, and filter 1FL2 are mated during bench alignment and are installed in the system as matched parts.
						H							7,9,10,20,21,23,24, 26,35,111,112,113, 114	Bench alignment
1FL3	Seven Section Filter Assembly 01-85389C02								H				104	Receiver filter circulator consisting of seven section filter assembly 1FL3, circulator 1HY1, isolator 1AT4, and filter 1FL2 are mated during bench alignment and are installed in system as matched parts.
1HY1	Waveguide-Circulator 58-85736C02								H				104	Same as remarks above

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1AT4	Isolator-Waveguide 58-87341B06								H				104	Same as remarks above
1FL2	Filter Assembly 01-86392C02								H				104	Same as remarks above
None	Control Panel MU573-SP1	0											104	Visual
			0											Replace hose or condenser
			F										1	
									F					Replace piece parts
None	Control Panel MU573-SP2													Same as Control Panel MU573-SP1
1A1MP20	Oven Assembly 01-85412C01	0											104	Visual
			0											Check coolant level
			F											
				0										Replenish coolant
									F					Visual
1A1A8	Condenser, Steam, Surface 01-86630C01	0											104	Visual leakage

Nomenclature of End Item or Comoonent Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont.)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1A1A8 (cont)	Condenser, Steam, Surface 01-86630C01			0										Replenish coolant, clean cooling ribs
									F				104	Replace hose or condenser
1A2	Power supply set 01-86628C01 consisting of the following Group numbers 1A2A1, 1A2A1A1 and 1A2A2:													
1A2A1	Power Supply PP-6414/FRC	0											104	Visual
			0											Built-in test equipment
			H										2,3,11,47,49,103,104	
				0									104	Cleaning
										F			104	Replace lamps
										H			104	

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
A2A1A1	Comparator-Control C-8437/FRC		H											Bench tested in power supply 1A2A1
									H					Based on testing
										H			104	Replace piece parts
1A2A2	Power Supply PP-6413/FRC	0											104	Visual
			F										1	Voltage and continuity tests
			H										1,3,13,36,38,39,93, 136,137,138,139,140, 141,142,143,145	
									0					Visual
									F					
										H			104	Replace piece parts
1A3	Sensing and Control Shelf Assy 01-86629C01	0											104	Visual

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1A3 (cont)	Sensing and Control Shelf Assy 01-86629C01	0											1	Voltage and continuity tests
				0										Cleaning
										F				Replace piece parts
1A3A1	Control, Transmitter C-8427/FRC		H										1,3,5,6,11,13,15,44, 42,46,71,82,83,88, 136,147,148,149,165, 166,133	Bench test
									F					Based on testing
										H			104	Replace piece parts
1A3A2	Control, Transmitter C-8427/FRC													Same as group number 1A3A1
1A3A3	Monitor, Transmitter-Receiver ID-1696/FRC		H										1,3,5,6,13,15,44,51, 71,82,83,88,136,147, 149,165,166,133	Bench test
									F					Based on testing
										H			116	Replace piece parts

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1A3A4	**Switching Unit, Baseband SA-1742/FRC**													See page C.2-11
1A3A5	**Switching Unit, Baseband SA-1742/FRC**													See page C.2-11
1A3A6	Monitor, Transmitter-Receiver ID-1696/FRC													Same as group number 1A3A3
1A3A7	Control, Transmitter Transfer C-8436/FRC		H										.6,15,37,44,46,74,90, 91,92,101,115,151, 154,155,156,165,166, 133	
									F					Based on testing
										H			104	Replace piece parts

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1A3A8	Squelch Control MB 241		H										1,3,6,12,13,45,48,82, 84,85,130,133,158, 159,165,166,101	Bench Tests
									F					Based on testing
										H			104	Replace piece parts
1A3A9	Baseband Switch MB 218		H										3,6,12,42,44,47,84, 133,1,2,15,16,14,9, 10,8,25,103	Bench Tests
									F					Based on testing
										H			104	Replace piece parts
1A3A10	Baseband Switch MB 218													Same as group number 1A3A9
1A3A11	Receiver control MB 162B		H										1,6,46,64,68,82,93, 147,148,160,165,166, 133,103,15,13,126, 169,170,115,88,124, 171,75,66,73,72,91, 89,70,172,144,101	Bench test
									F					Based on testing
										H			104	Replace piece parts
1A3A12	Receiver control MB 162B													Same as group number 1A3A11

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1A3A13	Alarm Relay, MB190A		F										1,104	Voltage and Continuity Tests
			H										6,133	Bench tests
									F					Based on testing
										H			104	Replace piece parts
1A3A14	Baseband Monitor MB 168A, Option B		F										1,104	Continuity Tests
			H										3,14,84,133	Bench tests
									F					Based on testing
										H			104	Replace piece parts

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire TR-987(V)1/FRC (cont)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1A4	Receiver-Transmitter, Radio RT-986(P)/FRC													Same as group number 1A1
1A5	Power Supply Set													Same as group number 1A2
1A6	Receiver-Transmitter, Order Wire RT-987(V)1/FRC	0											104	Visual
			0											Operational test
				0									104	Cleaning
					F									Station Adjustment, system adjustment
									F				104	
	Chassis, Electrical Equipment, Rack Mounted CH-650/FRC	0											104	Visual
			F										1	Voltage and continuity tests
										F			104	Replace piece parts

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1A6A1	Receiver, Order Wire R-1661/FRC		H										3,5,6,9,10,31,42,44, 64,65,66,67,80,107, 158,165,166,133	
									F					Based on testing
										H			104	Replace piece parts
1A6A2	Transmitter, Order Wire T-1162/FRC		H										1,3,5,6,9,10,15,31, 44,48,59,65, 72,73, 74,80,93,157,165, 166,133	Bench test
									F					Based on testing
										H			104	Replace piece parts
1A6A3	Signalling Unit, Order Wire TA-842/FRC		H										1,3,6,12,29,30,44, 49,63,68,77,88,132, 165,166,133	
									F					Based on testing
										H			104	Replace piece parts
1A6A4	Coupler, Order Wire Telephone Circuits CU-1912/FRC	H											3,5,75,159,133	Bench test

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont)

Group Number	Component Assembly Nomenclature	Maintenance Function c											Tools and Equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
a	b												d	e
1A6A4 (cont)	Coupler, Order Wire Telephone Circuits CU-1912/FRC								F					Based on testing
										H			104	Replace piece parts
1A6A5	Indicator-Direct Current Combiner ID-1701/FRC								0					Visual
			H										1	Bench test
									F					
										H			104	Replace piece parts
1A6A6	Monitor Panel, Telephone TA-814/FRC	0											104	Visual
			F										1	Voltage and continuity tests
									F				104	Replace piece parts
1A6A7	Handset H-303/U	0											104	Visual
			F										1	Voltage and continuity tests
													104	Replace piece parts

TABLE I. TOOL AND TEST EQUIPMENT REQUIREMENTS

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
1	O,F,H,D	Multimeter, AN/USM-210	6625-019-0815	
2	H,D	Differential Voltmeter, ME-202/U	6625-050-8686	
3	F,H,D	A.C. VTVM, ME-318/U	6625-727-4706	
4	H,D	Attenuator, Daven 651-73	6625-476-0515	
5	F,H,D	Oscillator, O-1025/U or AN/URM-27		
6	H (2 ea) D (2 ea)	Dual Power Supply, HP DPR6255A	6130-065-6811	
7	H,D	Sweep Generator, HP H01-694D	6625-947-7492	
8	F,H,D	R.F. Voltmeter AN/URM-145	6625-973-3986	
9	H,D	Oscilloscope, Tektronix 545	6625-799-7956	
10	H,D	Oscilloscope Plug-in Unit, AM-3174/U		
11	H,D	Test Jig, FEC 6289927		
12	F,H,D	Test Oscillator, SG-553/U	6625-778-9672	
13	H,D	D.C. VTVM, ME-266/USM-183	6625-720-3537	
14	H,D	V.H.F. Signal Generator, SG-309	6625-538-9879	
15	H,D	Power Supply, HP 6206B	6625-823-5359	
16	F,D	White Noise Test Set Marconi OA2090 AN/GSM-161		

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont)

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature		FSN	Tool Number
16a	F,D	60KHZ HP Filter Marconi TM-7728/1	F-1077/GSM		
16b	F,D	1052 KHZ LP Filter Marconi TM-7720/11			
16c	F,D	552KHZ LP Filter Marconi TM-7720/2			
16d	F,D	70 KHZ BS Filter Marconi TM-7729/2	F-1067/GSM	5915-939-5849	
16e	F,D	270 KHZ BS Filter Marconi TM-7729/5		5915-939-5847	
16f	F,D	534 KHZ BS Filter Marconi TM-7729/6			
16g	F,D	1002 KHZ BS Filter Marconi TM-7729/15	F-1071/GSM		
16h	F,D	70 KHZ BP Filter Marconi TM-7730/2			
16i	F,D	270 KHZ BP Filter Marconi TM-7730/5	F-1075/GSM	5915-916-2279	
16j	F,D	534 KHZ BP Filter Marconi TM-7730/6			
16k	F,D	1002 KHZ BP Filter Marconi TM-7730/15	F-1076/GSM		
16l	F,D	70 KHZ Oscillator Marconi TM-7794		6625-921-0499	
16m	F,D	270 KHZ Oscillator Marconi TM-7794/3	O-1317/GSM	6625-921-0501	
16n	F,D	534 KHZ Oscillator Marconi TM-7794/4		6625-921-0500	
16o	F,D	1002 KHZ Oscillator Marconi TM-7795/5	O-1321/GSM		
17	F,D	Selective Voltmeter, Sierra 128A		6625-935-4206	

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont)

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
18	F,H,D	Selective Voltmeter, Sierra 127C		
19	H,D	Deviation Calibrator, Motorola MU140-70		
20	H,D	Double Stub Tuner, Narda 903N		
21	H,D	Wavemeter, HP H532A	6625-730-8570	
22	H (1 ea) D (2 ea)	Directional Coupler, HP H752D	5985-583-9428	
23	H (2 ea) D (2 ea)	Detector Mount, HP H485B	6625-337-8355	
24	F (1 ea) H (1 ea) D (4 ea)	Waveguide Attenuator, CN-928/TRT		
25	F,H,D	Signal Generator, SG-321/U	6625-674-7097	
26	H,D (3 ea)	Isolator, Motorola 58-85480C02		
27	F,D	Power Meter, AN/USM-260	6625-917-3099	
28	F,D	Thermistor Mount, MX-2144A/U	6625-519-2414	
29	F,H,D	Frequency Counter, CP-772/U		
30	F,H,D	Frequency Converter, HP5255A	6625-058-3042	
31	H,D	Distortion Meter, TS-723A/U	6625-668-9418	

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont)

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
32	F,D	Noise Source, SG-337/U	6625-730-6918	
33	F,D	Attenuator, CN-796/U	5985-831-5991	
34	H,D (3 ea)	Waveguide Adapter, UG-51/U to 1477/U, Motorola 58C86723C01		
35	F (1 ea) H (2 ea)	Waveguide Coax Adapter, UG-1054/U		
36	H,D	Variable Transformer, GR W10MT3A	6120-054-7794	
37	F,H,D	Electronic Multimeter, ME-26A/U	6625-360-2493	
38	H,D	A.C. Ammeter, ME-156/U	6625-620-1405	
39	H,D	A.C. Voltmeter, AN/PSM-3 or ME-30E/U		
40	F,H,D	Signal Generator, AN/URM-44 or AN/URM-44A	6625-990-7700	
41	H,D	Microwave Link Analyzer, HP3701A/02A/03A		
42	H (6 ea) D (6 ea)	Test Cable, Pomona B-4		
43	H (2 ea) D (2 ea)	Test Cable, Pomona B-8		
44	H (7 ea) D (7 ea)	Test Cable, Pomona B-24		

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont)

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
45	H (2 ea) D (2 ea)	Test Cable, Pomona AL-B-24		
46	H,D	Test Cable, Pomona 1166-24		
47	H (2 ea) D (2 ea)	Test Cable, Pomona 1368-A-36		
48	H (2 ea) D (2 ea)	Test Cable,Pomona 2241-C-24		
49	H (3 ea) D (3 ea)	Test Cable, Pomona 2241-C-36		
50	H (5 ea) D (5 ea)	Test Cable, Pomona 2885		
51	H (3 ea) D (3 ea)	Test Cable, Pomona 3073		
52	F (2 ea)	Adapter, Pomona 1297		
53	F (2 ea) D (2 ea)	Test Cable, HP11001A	4935-724-9599	
54	F (2 ea) H (2 ea) D (2 ea)	Test Cable, HP10503A	6150-617-1470	

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont)

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
55	F (1 ea) H (3 ea) D (3 ea)	Test Cable, HP11500A	5995-686-4683	
56	F,D	Test Cable, HP11035A	4935-686-5463	
57	F (6 ea) H (6 ea) D (6 ea)	Test Cable, Pomona BNC-E-36	4935-686-5463	
58	D (2 ea)	Test Cable, HP11000A	5995-986-3323	
59	H,D	Test Cord, Pomona 1368-A-24		
60	F,H,D	Test Adapter, UG-274		
61	F (1 ea) H (1 ea) D (2 ea)	BNC Termination, 75 ohms Amphenol 46650-75		
62	H (2 ea) D (2 ea)	Variable Resistor, 2500 ohms, 2W, Clarostat 43C2-2500		
63	F (1 ea) H (2 ea) D (2 ea)	Resistor, 100K Ohms, 1/2W, 5%, RC20GF104J	5905-195-6761	
64	H (4 ea) D (4 ea)	Resistor, 4700 Ohms, 0.5W, 5%, RC20GF472J	5905-279-3501	
65	H (2 ea) D (2 ea)	Resistor, 39 Ohms, 0.5W, 5%, RC20GF390J	5905-195-5546	

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont)

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
66	H (2 ea) D (2 ea)	Resistor, 470 Ohms, 0.5W, 5%, RC20GF471J	5905-991-8595	
67	H,D	Resistor, 4700 Ohms, 2W, 5%, RC42GF472J	5905-257-0937	
68	H,D	Resistor, 27000 Ohms, 0.5W, 5%, RC20GF273J	5905-279-3499	
69	H,D	Resistor, 510 Ohms, 0.5W, 5%, RC20GF511J		
70	H,D	Resistor, 820 Ohms, 1/2W, 5%, RC20GF821J		
71	H,D	Resistor, 10 Ohms, 1/2W, 5%, RC20GF100J	5905-190-8883	
72	H,D	Resistor, 47K, 1/2W, 5%, RC20GF473J		
73	H (2 ea) D (2 ea)	Resistor, 3900 Ohms, 0.5W, 5%, RC20GF392J	5905-279-3505	
74	H (2 ea) D (2 ea)	Resistor, 2700 Ohms, 1/2W, 5%, RC20GF272J	5905-279-1880	
75	H,D	Resistor, 8200 Ohms, 0.5W, 5%, RC20GF822J		
76	H,D	Resistor, 1000 Ohms, 0.5W, 1%, RN65D1001F	5905-883-9198	
77	H,D	Resistor, 5600 Ohms, 1/4W, 1%, RN60D5601F		
78	H,D	Resistor, 31K Ohms, 1/2W, 5%, RC20GF313J		
79	H,D	Resistor, 56 Ohms, 1/2W, 5%, RC20GF560J		
80	H (3 ea) D (3 ea)	Resistor, 560 Ohms, 1/2W, 5%, RC20GF561J	5905-195-6800	

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont)

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
81	H (2 ea) D (2 ea)	Resistor, 1M Ohms, 1/2W, 5%, RC20GF105J	5905-925-7182	
82	H (4 ea) D (4 ea)	Resistor, 820 Ohms, 2W, 5%, RC42GF821J	5905-279-2286	
83	H,D	Resistor, 2200 Ohms, 1W, 5%, RC32GF222J	5905-279-1723	
84	F (7 ea) H (7 ea) D (7 ea)	Resistor, 75 Ohms, 1/2W, 1%, RN65D75R0J		
85	H,D	Resistor, 82 Ohms, 1/2W, 5%, RC20GF820J	5905-279-1894	
86	H,D	Resistor, 18K Ohms, 1/2W, 5%, RC20GF183J	5905-107-5286	
87	H,D	Resistor, 33K Ohms, 1/2W, 5%, RC20GF333J	5905-171-1998	
88	H (4 ea) D (4 ea)	Resistor, 1K Ohms, 1/2W, 5%, RC20GF102J	5905-195-6806	
89	H,D	Resistor, 68K, 1/2W, 5%, RC20GF683J		
90	H (2 ea) D (2 ea)	Resistor, 18 Ohms, 1/2W, 5%, RC20GF180J	5905-279-1753	
91	H,D	Resistor, 12K, 1/2W, 5%, RC20GF123J		
92	H (2 ea) D (2 ea)	Resistor, 3300 Ohms, 1/2W, 5%, RC20GF332J	5905-991-8596	

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont)

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
93	H (3 ea) D (3 ea)	Resistor, 10K Ohms, 1/2W, 5%, RC20GF103J	5905-107-6530	
94	H,D	Resistor, 390 Ohms, 1W, 5%, RC32GF391J	5905-959-9723	
95	H,D	Resistor, 1200 Ohms, 1/2W, 5%, RC20GF122J		
96	H,D	Capacitor, .047 ufd, 200v, CP05A1KC473K3	5910-819-5745	
97	H,D	Capacitor, .001 ufd, 200v, CP05A1KC102K3		
98	H,D	Capacitor, 51 pfd, 200v, Elmenco DM5-510J		
99	H,D	Capacitor, 2pfd, 200v, Elmenco DM5-020A		
100	H (2 ea) D (2 ea)	Capacitor, .25 ufd, 200v, Sprague 2TMP25		
101	H (6 ea) D (6 ea)	Diode 1N4002	5961-880-4783	
102	F (2 ea)	Adapter, Pomona 1469		
103	H,D	Power Supply, HP6267A	6625-990-3200	
104	O,F,H,D	Tool Kit, Electronic Equipment, TK-105/G	5180-610-8177	
105	F,H,D	W.G. Termination HPH910A	5985-888-5511	
106	H	Iris, Waveguide, FEC 6290451		
107	H	Capacitor, 3 uf, 500 VDC		

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont)

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
108	H,D	Resistor, 600 Ohms, 1/2W, 1%, RN70D6000F		
109	F,H,D	High Pass Filter, Hertz HP-7907-1		
110	F,H,D	Diode, 1N23C		
111	H,D	Slotted Section CG-1106/U, P/O AN/USM-37A, B or D		
112	H,D	Carriage MX-1545/USM-37, P/O AN/USM-37A,B or D		
113	H,D	Probe MX-1546/USM-37, P/O AN/USM-37, A,B or D		
114	H,D	SWR Meter ME-339/U or AN/USM-37A, B or D		
115	H (4 ea) D (4 ea)	Resistor, 150 Ohms, 2W, 5%, RC42GF151J		
116	F,H,D	Directional Coupler (3 dB) HPH752A	5985-679-0630	
117	H,D	Coax Detector HP 420A	4935-583-1526	
118	H,D	"T" Connector, "N" Type, UG-28A/U		
119	H,D	60 dB Isolator, Spare 1AT1, Motorola 58-87341B06		
120	H,D	Fuse, 1/4 Amp (3 required)		
121	H,D	Connector Cannon DEM-9S		
122	H,D	Low Pass Filter, Motorola 24-89660A01		
123	H,D	Capacitor, 8600 PF, 100 VDC, CDE WMF-1D68		

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont)

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
124	H (3 ea) D (3 ea)	Resistor, 1800 Ohms, 1/2W, 5%, RC20GF182J		
125	H,D	Switch, Rotary, Spare 1A1S4, Motorola 40-35392B01		
126	H,D	Meter, 50-0-50 ua (25-0-25 Scale), Spare 1A1M2, Motorola 72-88702B01		
127	H,D	Resistor, 100 Ohms, 1/2W, 5%, RC20GF101J		
128	H (2 ea) D(2 ea)	Resistor, 110 Ohms, 1/2W, 5%, RC20GF111J		
129	H,D	Capacitor, 0.01 UF 100 VDC, CDE WMF-1S1		
130	H (3 ea) D (3 ea)	Switch, Toggle, DPDT, Cutler Hammer 8680K1		
131	H,D	Meter, 0-200 ua (0-10 Scale), Spare 1A1M1, Motorola 72-88703B01		
132	H,D	AC VTVM AN/USM-106		
133	H,D	Module Test Jig, FEC 6290453		
134	H,D	Resistor, 15K, 1/2W, 5%, RC20GF153J (2 required)		
135	H,D	Switch, Rotary, 6-position, Grayhill 24001-6		
136	H,D	Switch, Toggle, SPST Cutler Hammer 7321K2 (3 required)		
137	H,D	Resistor, 3 Ohms, 25W, Ohmite 270-25-3 (2 required)		

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont)

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
138	H,D	Resistor, 5 Ohms, 200W Ohmite 270-225-5 (2 required)		
139	H,D	Resistor, 10 Ohms, 200W, Double Tapped, Ohmite 210-225-10		
140	H,D	Fuse, 4 Amp. 150V		
141	H,D	Lamp, Neon, NE/51		
142	H,D	Connector, US Components 990-18F with Hood		
143	H,D	Connector, US Components 990-18M with Hood		
144	H,D	Capacitor, 1 uF, 500 VDC		
145	H,D	Capacitor, 2000 uF, 50 VDC, Mallory CG23450C1		
146	H,D	Capacitor, 0.22 uF		
147	H,D	Battery, 1.5V (D Cell)		
148	H (2 ea) D (2 ea)	Resistor, Variable, 100 Ohms, 1/2W, Ohmite ASM6661		
149	H,D	Resistor, 300 Ohms, 1/2W, 5%, RC20GF301J		
150	H,D	Resistor, 22K, 1/2W, 5%, RC20GF223J		
151	H,D	Resistor, 680 Ohms, 1/2W, 5%, RC20GF681J		
152	H,D	Resistor, 68 Ohms, 2W, 5%, RC20GF680J		
153	H,D	Resistor, 3.3 Ohms, 1W, 5%, RC32GF3R3J (6 required)		

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont)

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
154	H,D	Lamp, 28V @40ma, GE Type 387		
155	H,D	Resistor, 270 Ohms, 2W, 5%, RC42GF271J		
156	H,D	Transformer Motorola 25-85423B03		
157	H,D	Resistor, 2000 Ohms, 1/2W, 1%, RN70D3001F		
158	H (2 ea) D (2 ea)	Diode, 1N751A		
159	H (2 ea) D (2 ea)	Resistor, 1K, 1W, 5%		
160	H,D	Resistor, 39K, 1/2W, 5%		
161	H (2 ea) D (2 ea)	Adapter, Pomona 1269		
162	H,D	Adapter, Pomona 1270		
163	H (2 ea) D (2 ea) F (6 ea)	Adapter, Pomona 1296		
164	H (6 ea) D (6 ea)	Test Cable, Pomona BNC-E-60		
165	H (2 ea) D (2 ea)	Test Cable, Pomona 2630		
166	H (2 ea) D (2 ea)	Test Cable, Pomona 3073		

Nomenclature of End Item or Component Radio Set AN/FRC-80(V)2 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (cont)

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
167	H,D	Resistor, 7500 ohms, 1/2W, 5%, RC20GF752J		
168	F,H,D	Module Extender, Motorola MK880		
169	H (2 ea) D (2 ea)	Transistor, 2N3638A		
170	H(2 ea) D (2 ea)	Transistor, 2N3393		
171	H,D	Resistor, variable, 10K Ohms		
172	H,D	Resistor, 22 Ohms, 1W, 5%, RC32GF220J		

APPENDIX C.2

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

C.2-1. General

This appendix provides a summary of the maintenance operations covered in the equipment literature for AN/FRC-80(V)3 and RT-987(V)1/FRC. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

C.2-2. Maintenance Functions

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine serviceability of an item by comparing it physical, mechanical, and electrical characteristics with established standards.

b. Test. To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc. This accomplished with external test equipment and does not include operation of the equipment and operator type tests using internal meters or indicating devices.

c. Service. To clean, to preserve, to charge, and to add fuel, lubricants, cooling agents, and air. If it is desired that elements, such as painting and lubricating, be defined separately, they may be so listed.

d. Adjust. To rectify to the extent necessary to bring into proper operating range.

e. Align. To adjust two or more components or assemblies of an electrical or mechanical system so that their functions are properly synchronized. This does not include setting the frequency control knob of radio receivers or transmitters to the desired frequency.

f. Calibrate. To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.

g. Install. To set up for use in an operational environment such as an encampment, site, or vehicle.

h. Replace. To replace unserviceable items with serviceable like items.

i. Repair. To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes, but is not limited to welding, grinding, riveting, straightening, and replacement of parts other than the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.

j. Overhaul. Normally, the highest degree of maintenance performed by the Army in order to minimize time work in process is consistent with quality and economy of operation. It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by maintenance standards in technical publications for each item of equipment. Overhaul normally does not return an item to like new, zero mileage, or zero hour condition.

k. Rebuild. The highest degree of materiel maintenance. It consists of restoring equipment as nearly as possible to new condition in accordance with original manufacturing standards. Rebuild is performed only when required by operational considerations or other paramount factors and then only at the depot maintenance category. Rebuild reduces to zero the hours or miles the equipment, or component thereof, has been in use.

l. Symbols. The uppercase letter placed in the appropriate column indicates the lowest level

at which that particular maintenance function is to be performed.

C.2-3. Explanation of Format

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Functional Group. Column 2 lists the noun names of components, assemblies, subassemblies, and modules on which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the maintenance category at which performance of the specific maintenance function is authorized. Authorization to perform a function at any category also includes authorization to perform that function at higher categories. The codes used represent the various maintenance categories as follows:

Code	*Maintenance category*
C	Operator/crew
O	Organizational maintenance
F	Direct support maintenance
H	General support maintenance
D	Depot maintenance

d. Column 4, Tools and Test Equipment. Column 4 specifies, by code, those tools and test equipments required to perform the designated function. The numbers appearing in this column refer to specific tools and test equipment which are identified in table I.

e. Column 5, Remarks. Self-explanatory.

C.2-4. Explanation of Format of Table I, Tool and Test Equipment Requirements

The columns in table I are as follows:

a. Tools and Equipment. The numbers in this column coincide with the numbers used in the tools and equipment column of the maintenance allocation chart. The numbers indicate the applicable tool for the maintenance function.

b. Maintenance Category. The codes in this column indicate the maintenance category normally allocated the facility.

c. Nomenclature. This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

d. Federal Stock Number. This column lists the Federal stock number of the specific tool or test equipment.

e. Tool Number. Not used.

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC

SECTION II — MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1	Radio Set AN/FRC-80(V)3	O											104	Visual
			O										1	Status indication by means of built-in test equipment, visual alarms, audible alarms, meter reading
			F										1, 3, 12, 16, 17, 24, 27, 28, 34, 35, 53, 54, 56, 57, 60, 61, 80, 161, 164, 168	
			H										8, 24, 32, 33, 34	
				O									104	Cleaning
					F								1, 3, 4, 12, 17, 18, 19, 40, 55, 60, 116	System adjustments including -- transmitter AFC, combiner AGC, modulation level, combiner gain, receiver calibration level, pilot sensing, squelch and orderwire adjustments.
					H								3, 4, 41, 109	
						H							7, 9, 10, 21, 22, 23, 24, 26, 35, 63, 79, 110	Seven section filter assembly alignment in the system
								F					104	
									F				104	Replace defective subassemblies
										O			104	Replace knobs, lights, etc.

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

SECTION II — MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1 (cont.)	Radio Set AN/FRC-80(V)3										D		1-184	Restore to serviceable condition
1A1	Receiver-Transmitter, Radio RT-986(P)/FRC	O												Visual
			O											Status indication by means of built-in test equipment, visual alarms, meter readings
				O										Cleaning
					F									Peaking by means of built-in test equipment
										O			104	Replace knobs, lights, etc.
										F			104	
1A1A1	Limiter, Electrical Noise CN-1345/FRC		H										1, 6, 12, 13, 15, 44, 50, 80, 84, 85, 94, 122, 131, 132, 133, 165, 166	Bench Test
									F					Based on testing
										H			104	Replace piece parts
1A1A2	Control, Receiver C-8434/FRC		H										6, 9, 10, 15, 37, 42, 44, 46, 62, 63, 83, 86, 87, 96, 97, 98, 99, 103, 134, 135, 165, 166, 133	Bench Test

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

SECTION II — MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A1A2 (cont.)	Control, Receiver C-8434/FRC								F					Based on testing
										H			104	Replace piece parts
1A1A3	Control, Klystron C-8435/FRC		H										3, 5, 6, 9, 10, 15, 29, 30, 42, 44, 46, 48, 64, 79, 80, 81, 133, 150	Bench test
									F					Based on testing
										H			104	Replace piece parts
1A1A4	Amplifier-Modulator AM-6262/FRC		H										1, 3, 4, 5, 6, 12, 16, 42, 43, 45, 50, 80, 84, 85, 128, 133, 161, 163, 165, 166, 167	Bench test
									F					Based on testing
										H			104	Replace piece parts
1A1A5	Amplifier-Demodulator AM-6261/FRC, AM-6325/FRC, AM-6326/FRC								F					Factory repair. See SB11-497
1A1A6	Equalizer, Time Delay CN-1320/FRC								F					Factory repair. See SB11-497
1A1A9	Waveguide Assembly 01-86631C01													Replace waveguide sections
1A1A9A1	Detector, Frequency Monitor 01-85484C02								O				104	Visual
									F				104	

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

SECTION II — MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A1A9AT1	Isolator, Radio Freq Reflection 58-85480C03								O				104	Visual
									F				104	
1A1A9DC1	Coupler, Frequency Monitor 01-85482C04								O				104	Visual
1A1A9W1	Boiler Assembly 58-86394C01								O				104	Visual
									F				104	
1A1A9Z1	Cavity, Tuned, Reference 01-85483C03								F				104	Based on testing
						H							7, 9, 10, 20, 24, 26, 29, 30, 35, 40, 117, 118, 119	Bench test
1A1A9Z2	Cavity, Tuned, Linearized 01-85726C03								F				104	Based on testing
										H			104	Restore to serviceable condition
						H								In system
1A1A7	Mixer-Local Osc-Preamplifier 01-85485C04				F									Varactor, oscillator and mixer adjustment using built-in test equipment in system
									F					Based on testing
									H				104	Replace piece parts
					H								3, 6, 15, 26, 29, 30, 35, 40, 62, 63, 66, 84, 106, 120 thru 131	Bench Alignment

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

SECTION II — MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A1A7A1	Local Oscillator 01-88988B02				F									Built-in test equipment
									H				104	Bench test
										H			104	Replace piece parts
1A1A7A2	Amplifier, Intermediate Freq 01-85338C01								H				104	Based on testing
										H			104	Replace piece parts
1A1A7A3	Waveguide Assembly, Mixer LO 58-85730C01								H				104	Based on testing
										H			104	Replace piece parts
1AT5	Isolator, Radio Freq, Reflection 58-87341B06									O			104	Visual
										F			104	
1AT3	Waveguide and Tuning Assembly 01-86438C01									F			104	Based on testing
					F								104	In system
1AT6	Waveguide and Tuning Assembly 01-86438C01													Same as group number 1AT3
1W1	Waveguide, Spacer, H-Bend 01-86438C01								F				104	Based on testing
1FL1	Seven Section Filter Assembly 01-86390C04								F				104	Based on testing
						H							7, 9, 10, 20, 21, 23, 24, 26, 35, 111, 112, 113, 114	Bench alignment

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

SECTION II — MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1AT1	Isolator, Radio Freq Reflection 58-87341B06								F				104	Isolators 1AT1 and 1AT2 are mated with seven section filter assembly 1FL1 during bench alignment and are replaced with the seven section filter assembly
1AT2	Isolator, Radio Freq Reflection 58-87341B06								F				104	Same remarks as above
1A9	Waveguide Assembly, Transmitter 01-85740C02								F				104	Based on testing
										H			104	Replace piece parts
						H							1, 7, 9, 10, 15, 20, 21, 22, 23, 24, 35, 105, 111, 112, 113, 114, 115	Bench alignment
	Receiver Filter Circulator consisting Of:								F				104	Receiver filter circulator consisting of seven section filter assembly 1FL3, circulator 1HY1, isolator 1AT4, and filter 1FL2 are mated during bench alignment and are installed in the system as matched parts
						H							7, 9, 10, 20, 21, 23, 24, 26, 35, 111, 112, 113, 114	Bench alignment

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

SECTION II — MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1FL3	Seven Section Filter Assembly 01-86389C02								H				104	Receiver filter circulator consisting of seven section filter assembly 1FL3, circulator 1HY1, isolator 1AT4, and filter 1FL2 are mated during bench alignment and are installed in system as matched parts.
1HY1	Waveguide-Circulator 58-85736C02								H				104	Same as remarks above
1AT4	Isolator-Waveguide 58-87341B06								H				104	Same as remarks above
1FL2	Filter Assembly 01-86392C02								H				104	Same as remarks above
None	Control Panel MU573-SP1	O											104	Visual
			O											Replace hose or condenser
			F										1	
									F					Replace piece parts
None	Control Panel MU573-SP2													Same as Control Panel MU573-SP1
1A1MP20	Oven Assembly 01-85412C01	O											104	Visual
			O											Check coolant level
			F											
				O										Replenish coolant
									F					Visual

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

SECTION II — MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A1A8	Condenser, Steam, Surface 01-86630C01	O											104	Visual leakage
				O										Replenish coolant, clean cooling ribs
									F				104	Replace hose or condenser
1A2	Power supply set 01-86628C01 consisting of the following Group numbers 1A2A1, 1A2A1A1 and 1A2A2:													
1A2A1	Power Supply PP-6414/FRC	O											104	Visual
			O											Built-in test equipment
			H										2, 3, 11, 47, 49, 103, 104	
				O									104	Cleaning
										F			104	Replace lamps
										H			104	
1A2A1A1	Comparator-Control C-8437/FRC		H											Bench tested in power supply 1A2A1
									H					Based on testing
										H			104	Replace piece parts
1A2A2	Power Supply PP-6413/FRC	O											104	Visual
			F										1	Voltage and continuity tests

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

SECTION II — MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A3A1	Control, Transmitter C-8427/FRC		H										1, 3, 5, 6, 11, 13, 15, 44, 42, 46, 71, 82, 83, 88, 136, 147, 148, 149, 165, 166, 133	Bench test
									F					Based on testing
										H			104	Replace piece parts
1A3A2	Monitor, Transmitter-Receiver ID-1696/FRC		H										1, 3, 5, 6, 13, 15, 44, 51, 71, 82, 83, 88, 136, 147, 149, 165, 166, 133	Bench test
									F					Based on testing
										H			116	Replace piece parts
1A3A3	Monitor, Transmitter-Receiver ID-1696/FRC													Same as group number 1A3A2
1A3A4	Switching Unit, Baseband SA-1742/FRC		H										3, 6, 12, 42, 44, 47, 84, 133, 1, 2, 15, 16, 14, 9, 10, 8, 25, 103	Bench tests
									F					Based on testing
										H			104	Replace piece parts
1A3A5	Switching Unit, Baseband SA-1742/FRC													Same as group number 1A3A4
1A3A6	Monitor, Transmitter-Receiver ID-1696/FRC													Same as group number 1A3A2

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

SECTION II — MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A2A2 (cont.)	Power Supply PP-6413/FRC		H										1, 3, 13, 36, 38, 39, 93, 136, 137, 138, 139, 140, 141, 142, 143, 145	
									O					Visual
									F					
										H			104	Replace piece parts
1A2A2	Power Supply PP-6735/FRC	O											104	Visual
			F										1	Voltage and continuity tests
			H										1, 13, 93, 103, 136, 137, 138, 139, 140, 142, 143, 145, 185	Bench test
									O					Visual
									F					Based on testing
										H			104	Replace parts
1A3	Sensing and Control Shelf Assy 01-86629C01	O											104	Visual
		O											1	Voltage and continuity tests
				O										Cleaning
										F				Replace piece parts

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

SECTION II — MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A3A7	Monitor, Transmitter-Receiver ID-1696/FRC													Same as group number 1A3A2
1A3A8	Control, Transmitter C-8427/FRC													Same as group number 1A3A1
1A3A9	Control, Transmitter Transfer C-8436/FRC		H										6, 15, 37, 44, 46, 74, 90, 91, 92, 101, 115, 151, 154, 155, 156, 165, 166, 133	
									F					Based on testing
										H			104	Replace piece parts
1A3A10	Relay Assembly RE-1050/FRC		F										1, 104	Voltage and continuity tests
			H										6, 133	Bench tests
									F					Based on testing
										H			104	Replace piece parts
1A3A11	Test Module, Baseband Monitoring TS-2996/FRC		F										1, 104	Continuity Tests
			H										3, 14, 84, 133	Bench tests
									F					Based on testing
										H			104	Replace piece parts

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

SECTION II — MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A3A12	Control, Alarm C-8553/FRC		H										1, 6, 46, 64, 68, 82, 93, 147, 148, 160, 165, 166, 133, 103, 15, 13, 126, 169, 170, 115, 88, 124, 171, 75, 66, 73, 72, 91, 89, 70, 172, 144, 101	Bench test
									F					Based on testing
										H			104	Replace piece parts
1A3A13	Limiter, Electrical Noise CN-1346/FRC		H										1, 3, 6, 12, 13, 45, 48, 82, 84, 85, 130, 133, 158, 159, 165, 166, 101	Bench tests
									F					Based on testing
										H			104	Replace piece parts
1A3A14	Control, Alarm C-8553/FRC													Same as group number 1A3A12
1A4	Receiver-Transmitter, Radio RT-986(P)/FRC													Same as group number 1A1
1A5	Power Supply Set													Same as group number 1A2
1A6	Receiver-Transmitter, Order Wire RT-987(V)1/FRC	O											104	Visual
			O											Operational test

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

SECTION II — MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A6A3	Signalling Unit, Order Wire TA-842/FRC		H										1, 3, 6, 12, 29, 30, 44, 49, 63, 68, 77, 88, 132, 165, 166, 133	
									F					Based on testing
										H			104	Replace piece parts
1A6A4	Coupler, Order Wire Telephone Circuits CU-1912/FRC	H											3, 5, 75, 159, 133	Bench test
									F					Based on testing
										H			104	Replace piece parts
1A6A5	Indicator-Direct Current Combiner ID-1701/FRC								O					Visual
			H										1	Bench test
									F					
										H			104	Replace piece parts
P/O 1A6	Monitor Panel, Telephone TA-844/FRC	O											104	Visual
			F										1	Voltage and continuity tests
									F				104	Replace piece parts
P/O 1A6	Handset H-303/U	O											104	Visual
			F										1	Voltage and continuity tests
										F			104	Replace piece parts

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

SECTION II — MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A6 (cont.)	Receiver-Transmitter, Order Wire RT-987(V)1/FRC			O									104	Cleaning
					F									Station adjustment, system adjustment
									F				104	
P/O 1A6	Chassis, Electrical Equipment, Rack Mounted CH-650/FRC	O											104	Visual
			F										1	Voltage and continuity tests
										F			104	Replace piece parts
1A6A1	Receiver, Order Wire R-1661/FRC		H										3, 5, 6, 9, 10, 31, 42, 44, 64, 65, 66, 67, 80, 107, 158, 165, 166, 133	
									F					Based on testing
										H			104	Replace piece parts
1A6A2	Transmitter, Order Wire T-1162/FRC		H										1, 3, 5, 6, 9, 10, 15, 31, 44, 48, 59, 65, 72, 73, 74, 80, 93, 157, 165, 166, 133	Bench test
									F					Based on testing
										H			104	Replace piece parts

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

SECTION II — MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A10	Pre-emphasis and De-emphasis Assembly 01V87102C79	O											104	Visual
			O										1	Voltage and continuity tests
				O										Cleaning
										F				Replace jacks and assemblies
1A10A1	Amplifier, Pre-emphasis AM-6480/FRC		H										1, 6, 8, 9, 10, 12, 14, 16, 29, 30, 80, 84, 85, 132, 133, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183	Bench test
									F					Based on system testing
										H			104	Replace piece parts
1A10A2	Amplifier, Pre-emphasis AM-6480/FRC													Same as group number 1A10A1
1A10A3	Amplifier, De-emphasis AM-6490/FRC		H										1, 6, 8, 9, 10, 12, 14, 16, 29, 30, 84, 85, 132, 133, 173, 174	Bench test
									F					Based on system testing
										H			104	Replace piece parts
1A10A4	Amplifier, De-emphasis AM-6490/FRC													Same as group number 1A10A3

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

SECTION II — MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A11	Cabinet, Electrical Equipment CY-7200/FRC	O												Visual
			O										1	Voltage and continuity tests
				O										Cleaning
	TUNNEL DIODE AMPLIFIER IMC MODEL ACP-8204-17	O											104	Visual
			F										13	Gain test using AN/FRC-80(V) built-in meter indications bias test
			H										8,24,32,33, 34,57,104	Receiver noise figure
									H				104	Refer to SB11-497 for factory repair

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC

TABLE I. — TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE		FEDERAL STOCK NUMBER	TOOL NUMBER
1	O, F, H, D	Multimeter, AN/USM-210		6625-019-0815	
2	H, D	Differential Voltmeter, ME-202/U		6625-050-8686	
3	F, H, D	A.C. VTVM, ME-318/U		6625-727-4706	
4	H, D	Attenuator, Daven 651-73		6625-476-0515	
5	F, H, D	Oscillator, O-1025/U or AN/URM-27			
6	H (2 ea) D (2 ea)	Dual Power Supply, HP DPR6255A		6130-065-6811	
7	H, D	Sweep Generator, HP H01-694D		6625-947-7492	
8	F, H, D	R.F. Voltmeter AN/URM-145		6625-973-3986	
9	H, D	Oscilloscope, Tektronix 545		6625-799-7956	
10	H, D	Oscilloscope Plug-in Unit, AM-3174/U			
11	H, D	Test Jig, FEC 6289927			
12	F, H, D	Test Oscillator, SG-553/U		6625-778-9672	
13	H, D	D.C. VTVM, ME-266/USM-183		6625-720-3537	
14	H, D	V.H.F. Signal Generator, SG-309		6625-538-9879	
15	H, D	Power Supply, HP 6206B		6625-823-5359	
16	F, D	White Noise Test Set Marconi OA2090	AN/GSM-161		
16a	F, D	60KHZ HP Filter Marconi TM-7728/1	F-1077/GSM		
16b	F, D	2660 LP Filter Marconi TM-7720/12			
16c	F, D	70 KHZ BS Filter Marconi TM-7729/2	F-1067/GSM	5915-939-5849	

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

TABLE I. — TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	FEDERAL STOCK NUMBER	TOOL NUMBER
16d	F, D	534 KHZ BS Filter Marconi TM-7729/6		
16e	F, D	1248 KHZ BS Filter Marconi TM-7729/7		
16f	F, D	2438 KHZ BS Filter Marconi TM-7729/8		
16g	F, D	70 KHZ BP Filter Marconi TM-7730/2		
16h	F, D	534 KHZ BP Filter Marconi TM-7730/6		
16i	F, D	1248 KHZ BP Filter Marconi TM-7730/7		
16j	F, D	2438 KHZ BP Filter Marconi TM-7730/8		
16k	F, D	70 KHZ Oscillator Marconi TM-7794	6625-921-0499	
16l	F, D	534 KHZ Oscillator Marconi TM-7794/4	6625-921-0500	
16m	F, D	1248 KHZ Oscillator Marconi TM-7795		
16n	F, D	2438 KHZ Oscillator Marconi TM-7795/1		
17	F, D	Selective Voltmeter, Sierra 128A	6625-935-4206	
18	F, H, D	Selective Voltmeter, Sierra 127C		
19	H, D	Deviation Calibrator, Motorola MU140-70		
20	H, D	Double Stub Tuner, Narda 903N		
21	H, D	Wavemeter, HP H532A	6625-730-8570	
22	H (1 ea) D (2 ea)	Directional Coupler, HP H752D	5985-583-9428	
23	H (2 ea) D (2 ea)	Detector Mount, HP H485B	6625-337-8355	

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

TABLE I. — TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	FEDERAL STOCK NUMBER	TOOL NUMBER
24	F (1 ea) H (1 ea) D (4 ea)	Waveguide Attenuator, CN-928/TRT		
25	F, H, D	Signal Generator, SG-321/U	6625-674-7097	
26	H, D (3 ea)	Isolator, Motorola 58-85480C02		
27	F, D	Power Meter, AN/USM-260	6625-917-3099	
28	F, D	Thermistor Mount, MX-2144A/U	6625-519-2414	
29	F, H, D	Frequency Counter, CP-772/U		
30	F, H, D	Frequency Converter, HP5255A	6625-058-3042	
31	H, D	Distortion Meter, TS-723A/U	6625-668-9418	
32	F, D	Noise Source, SG-337/U	6625-730-6918	
33	F, D	Attenuator, CN-796/U	5985-831-5991	
34	H, D (3 ea)	Waveguide Adapter, UG-51/U to 1477/U, Motorola 58C86723C01		
35	F (1 ea) H (2 ea)	Waveguide Coax Adapter, UG-1054/U		
36	H, D	Variable Transformer, GR W10MT3A	6120-054-7794	
37	F, H, D	Electronic Multimeter, ME-26A/U	6625-360-2493	
38	H, D	A.C. Ammeter, ME-156/U	6625-620-1405	
39	H, D	A.C. Voltmeter, AN/PSM-3 or ME-30E/U		
40	F, H, D	Signal Generator, AN/URM-44 or AN/URM-44A	6625-990-7700	

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

TABLE I. — TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	FEDERAL STOCK NUMBER	TOOL NUMBER
41	H, D	Microwave Link Analyzer, HP3701A/02A/03A		
42	H (6 ea) D (6 ea)	Test Cable, Pomona B-4		
43	H (2 ea) D (2 ea)	Test Cable, Pomona B-8		
44	H (7 ea) D (7 ea)	Test Cable, Pomona B-24		
45	H (2 ea) D (2 ea)	Test Cable, Pomona AL-B-24		
46	H, D	Test Cable, Pomona 1166-24		
47	H (2 ea) D (2 ea)	Test Cable, Pomona 1368-A-36		
48	H (2 ea) D (2 ea)	Test Cable, Pomona 2241-C-24		
49	H (3 ea) D (3 ea)	Test Cable, Pomona 2241-C-36		
50	H (5 ea) D (5 ea)	Test Cable, Pomona 2885		
51	H (3 ea) D (3 ea)	Test Cable, Pomona 3073		
52	F (2 ea)	Adapter, Pomona 1297		
53	F (2 ea) D (2 ea)	Test Cable, HP11001A	4935-724-9599	
54	F (2 ea) H (2 ea) D (2 ea)	Test Cable, HP10503A	6150-617-1470	

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

TABLE I. — TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	FEDERAL STOCK NUMBER	TOOL NUMBER
55	F (1 ea) H (3 ea) D (3 ea)	Test Cable, HP11500A	5995-686-4683	
56	F, D	Test Cable, HP11035A	4935-686-5463	
57	F (6 ea) H (6 ea) D (6 ea)	Test Cable, Pomona BNC-E-36	4935-686-5463	
58	D (2 ea)	Test Cable, HP11000A	5995-986-3323	
59	H, D	Test Cord, Pomona 1368-A-24		
60	F, H, D	Test Adapter, UG-274		
61	F (1 ea) H (1 ea) D (2 ea)	BNC Termination, 75 ohms Amphenol 46650-75		
62	H (2 ea) D (2 ea)	Variable Resistor, 2500 ohms, 2W, Clarostat 43C2-2500		
63	F (1 ea) H (2 ea) D (2 ea)	Resistor, 100K Ohms, 1/2W, 5%, RC20GF104J	5905-195-6761	
64	H (4 ea) D (4 ea)	Resistor, 4700 Ohms, 0.5W, 5%, RC20GF472J	5905-279-3501	
65	H (2 ea) D (2 ea)	Resistor, 39 Ohms, 0.5W, 5%, RC20GF390J	5905-195-5546	
66	H (2 ea) D (2 ea)	Resistor, 470 Ohms, 0.5W, 5%, RC20GF471J	5905-991-8595	
67	H, D	Resistor, 4700 Ohms, 2W, 5%, RC42GF472J	5905-257-0937	

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

TABLE I. — TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	FEDERAL STOCK NUMBER	TOOL NUMBER
68	H, D	Resistor, 27K Ohms, 0.5W, 5%, RC20GF273J	5905-279-3499	
69	H, D	Resistor, 510 Ohms, 0.5W, 5%, RC20GF511J		
70	H, D	Resistor, 820 Ohms, 1/2W, 5%, RC20GF821J		
71	H, D	Resistor, 10 Ohms, 1/2W, 5%, RC20GF100J	5905-190-8883	
72	H, D	Resistor, 47K, 1/2W, 5%, RC20GF473J		
73	H (2 ea) D (2 ea)	Resistor, 3900 Ohms, 0.5W, 5%, RC20GF392J	5905-279-3505	
74	H (2 ea) D (2 ea)	Resistor, 2700 Ohms, 1/2W, 5%, RC20GF272J	5905-279-1880	
75	H, D	Resistor, 8200 Ohms, 0.5W, 5%, RC20GF822J		
76	H, D	Resistor, 1000 Ohms, 0.5W, 1%, RN65D1001F	5905-883-9198	
77	H, D	Resistor, 5600 Ohms, 1/4W, 1%, RN60D5601F		
78	H, D	Resistor, 31K Ohms, 1/2W, 5%, RC20GF313J		
79	H, D	Resistor, 56 Ohms, 1/2W, 5%, RC20GF560J		
80	H (3 ea) D (3 ea)	Resistor, 560 Ohms, 1/2W, 5%, RC20GF561J	5905-195-6800	
81	H (2 ea) D (2 ea)	Resistor, 1M Ohms, 1/2W, 5%, RC20GF105J	5905-925-7182	
82	H (4 ea) D (4 ea)	Resistor, 820 Ohms, 2W, 5%, RC42GF821J	5905-279-2286	
83	H, D	Resistor, 2200 Ohms, 1W, 5%, RC32GF222J	5905-279-1723	

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

TABLE I. — TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	FEDERAL STOCK NUMBER	TOOL NUMBER
84	F (7 ea) H (7 ea) D (7 ea)	Resistor, 75 Ohms, 1/2W, 1%, RN65D75R0J		
85	H, D	Resistor, 82 Ohms, 1/2W, 5%, RC20GF820J	5905-279-1894	
86	H, D	Resistor, 18K Ohms, 1/2W, 5%, RC20GF183J	5905-107-5286	
87	H, D	Resistor, 33K Ohms, 1/2W, 5%, RC20GF333J	5905-171-1998	
88	H (4 ea) D (4 ea)	Resistor, 1K Ohms, 1/2W, 5%, RC20GF102J	5905-195-6806	
89	H, D	Resistor, 68K, 1/2W, 5%, RC20GF683J		
90	H (2 ea) D (2 ea)	Resistor, 18 Ohms, 1/2W, 5%, RC20GF180J	5905-279-1753	
91	H, D	Resistor, 12K, 1/2W, 5%, RC20GF123J		
92	H (2 ea) D (2 ea)	Resistor, 3300 Ohms, 1/2W, 5%, RC20GF332J	5905-991-8596	
93	H (3 ea) D (3 ea)	Resistor, 10K Ohms, 1/2W, 5%, RC20GF103J	5905-107-6530	
94	H, D,	Resistor, 390 Ohms, 1W, 5%, RC32GF391J	5905-959-9723	
95	H, D	Resistor, 1200 Ohms, 1/2W, 5%, RC20GF122J		
96	H, D	Capacitor, .047 ufd, 200v, CP05A1KC473K3	5910-819-5745	
97	H, D	Capacitor, .001 ufd, 200v, CP05A1KC102K3		
98	H, D	Capacitor, 51 pfd, 200v, Elmenco DM5-510J		
99	H, D	Capacitor, 2 pfd, 200v, Elmenco DM5-020A		

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

TABLE I. — TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	FEDERAL STOCK NUMBER	TOOL NUMBER
100	H (2 ea) D (2 ea)	Capacitor, .25 ufd, 200v, Sprague 2TMP25		
101	H (6 ea) D (6 ea)	Diode 1N4002	5961-880-4783	
102	F (2 ea)	Adapter, Pomona 1469		
103	H, D	Power Supply, HP6267A	6625-990-3200	
104	O, F, H, D	Tool Kit, Electronic Equipment, TK-105/G	5180-610-8177	
105	F, H, D	W.G. Termination HPH910A	5985-888-5511	
106	H	Iris, Waveguide, FEC 6290451		
107	H	Capacitor, 3 uf, 500 VDC		
108	H, D	Resistor, 600 Ohms, 1/2W, 1%, RN70D6000F		
109	F, H, D	High Pass Filter, Hertz HP-7907-1		
110	F, H, D	Diode, 1N23C		
111	H, D	Slotted Section CG-1106/U, P/O AN/USM-37A, B or D		
112	H, D	Carriage MX-1545/USM-37, P/O AN/USM-37A, B or D		
113	H, D	Probe MX-1546/USM-37, P/O AN/USM-37, A, B or D		
114	H, D	SWR Meter ME-339/U or AN/USM-37A, B or D		
115	H (4 ea) D (4 ea)	Resistor, 150 Ohms, 2W, 5%, RC42GF151J		
116	F, H, D	Directional Coupler (3 dB) HPH752A	5985-679-0630	
117	H, D	Coax Detector HP 420A	4935-583-1526	

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

TABLE I. — TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	FEDERAL STOCK NUMBER	TOOL NUMBER
118	H, D	"T" Connector, "N" Type, UG-28A/U		
119	H, D	60 dB Isolator, Spare 1AT1, Motorola 58-87341B06		
120	H, D	Fuse, 1/4 Amp (3 required)		
121	H, D	Connector Cannon DEM-9S		
122	H, D	Low Pass Filter, Motorola 24-89660A01		
123	H, D	Capacitor, 8600 PF, 100 VDC, CDE WMF-1D68		
124	H (3 ea) D (3 ea)	Resistor, 1800 Ohms, 1/2W, 5%, RC20GF182J		
125	H, D	Switch, Rotary, Spare 1A1S4, Motorola 40-35392B01		
126	H, D	Meter, 50-0-50 ua (25-0-25 Scale), Spare 1A1M2, Motorola 72-88702B01		
127	H, D	Resistor, 100 Ohms, 1/2W, 5%, RC20GF101J		
128	H (2 ea) D (2 ea)	Resistor, 110 Ohms, 1/2W, 5%, RC20GF111J		
129	H, D	Capacitor, 0.01 uF, 100 VDC, CDE WMF-1S1		
130	H (3 ea) D (3 ea)	Switch, Toggle, DPDT, Cutler Hammer 8680K1		
131	H, D	Meter, 0-200 ua (0-10 Scale), Spare 1A1M1, Motorola 72-88703B01		
132	H, D	AC VTVM AN/USM-106		
133	H, D	Module Test Jig, FEC 6290453		
134	H, D	Resistor, 15K, 1/2W, 5%, RC20GF153J (2 required)		
135	H, D	Switch, Rotary, 6-position, Grayhill 24001-6		

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

TABLE I. — TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	FEDERAL STOCK NUMBER	TOOL NUMBER
136	H, D	Switch, Toggle, SPST Cutler Hammer 7321K2 (3 required)		
137	H, D	Resistor, 3 Ohms, 25W, Ohmite 270-25-3 (2 required)		
138	H, D	Resistor, 5 Ohms, 200W Ohmite 270-225-5 (2 required)		
139	H, D	Resistor, 10 Ohms, 200W, Double Tapped, Ohmite 210-225-10		
140	H, D	Fuse, 4 Amp. 150V		
141	H, D	Lamp, Neon, NE/51		
142	H, D	Connector, US Components 990-18F with Hood		
143	H, D	Connector, US Components 990-18M with Hood		
144	H, D	Capacitor, 1 uF, 500 VDC		
145	H, D	Capacitor, 2000 uF, 50 VDC, Mallory CG23450C1		
146	H, D	Capacitor, 0.22 uF		
147	H, D	Battery, 1.5V (D Cell)		
148	H (2 ea) D (2 ea)	Resistor, Variable, 100 Ohms, 1/2W, Ohmite ASM6661		
149	H, D	Resistor, 300 Ohms, 1/2W, 5%, RC20GF301J		
150	H, D	Resistor, 22K, 1/2W, 5%, RC20GF223J		
151	H, D	Resistor, 680 Ohms, 1/2W, 5%, RC20GF681J		
152	H, D	Resistor, 68 Ohms, 2W, 5%, RC20GF680J		
153	H, D	Resistor, 3.3 Ohms, 1W, 5%, RC32GF3R3J (6 required)		
154	H, D	Lamp, 28V @40ma, GE Type 387		

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

TABLE I. — TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	FEDERAL STOCK NUMBER	TOOL NUMBER
155	H, D	Resistor, 270 Ohms, 2W, 5%, RC42GF271J		
156	H, D	Transformer Motorola 25-85423B03		
157	H, D	Resistor, 2000 Ohms, 1/2W, 1%, RN70D2001F		
158	H (2 ea) D (2 ea)	Diode, 1N751A		
159	H (2 ea) D (2 ea)	Resistor, 1K, 1W, 5%		
160	H, D	Resistor, 39K, 1/2W, 5%		
161	H (2 ea) D (2 ea)	Adapter, Pomona 1269		
162	H, D	Adapter, Pomona 1270		
163	H (2 ea) D (2 ea) F (6 ea)	Adapter, Pomona 1296		
164	H (6 ea) D (6 ea)	Test Cable, Pomona BNC-E-60		
165	H (2 ea) D (2 ea)	Test Cable, Pomona 2630		
166	H (2 ea) D (2 ea)	Test Cable, Pomona 3073		
167	H, D	Resistor, 7500 Ohms, 1/2W, 5%, RC20GF752J		
168	F, H, D	Module Extender, Motorola MK880		
169	H (2 ea) D (2 ea)	Transistor, 2N3638A		

Nomenclature of End Item or Component: Radio Set AN/FRC-80(V)3 and Receiver-Transmitter, Order Wire RT-987(V)1/FRC (Cont)

TABLE I. — TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	FEDERAL STOCK NUMBER	TOOL NUMBER
170	H (2 ea) D (2 ea)	Transistor, 2N3393		
171	H, D	Resistor, variable, 10K Ohms		
172	H, D	Resistor, 22 Ohms, 1W, 5%, RC32GF220J		
173	H, D	Resistor, 43 Ohms, 1/2W, 5%, RC20GF430J		
174	H, D	Resistor, 91 Ohms, 1/2W, 5% RC20GF910J		
175	H (2 ea) D (2 ea)	Resistor, 453 Ohms, 1/2W, 1%, RN65D4530F		
176	H, D	Resistor, 549 Ohms, 1/2W, 1%, RN65D5490F		
177	H, D	Resistor, 750 Ohms, 1/2W, 1%, RN65D7500F		
178	H, D	Resistor, 2800 Ohms, 1/2W, 5%, RC20GF282J		
179	H, D	Resistor, 7500 Ohms, 1/2W, 1%, RN65D7501F		
180	H, D	Capacitor, 4.7 uF, 35 VDC, CS13BF475K		
181	H, D	Capacitor, 10 uF, 35 VDC, CS13BF106K		
182	H, D	Capacitor, 15 uF, 35 VDC, CS13BF156K		
183	H, D	Capacitor, 0.68 uF, 35 VDC, CS13BF684K		
184	H, D	Multimeter TS-352/U		

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11-98
11-117
11-127
11-158
11-500 (AA-AC)

NG: None.

USAR: None.

For explanation of abbreviations used, see AR 310-50.

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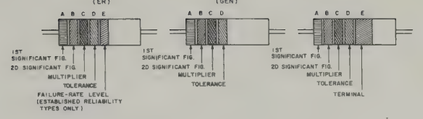


COLOR CODE MARKING FOR COMPOSITION TYPE RESISTORS.

COLOR-CODE MARKING FOR FILM-TYPE RESISTORS

TABLE I
COLOR CODE FOR COMPOSITION TYPE AND FILM TYPE RESISTORS.

BAND A		BAND B		BAND C		BAND D		BAND E		
COLOR	FIRST SIGNIFICANT FIGURE	COLOR	SECOND SIGNIFICANT FIGURE	COLOR	MULTIPLIER	COLOR	RESISTANCE TOLERANCE (PERCENT)	COLOR	FAILURE RATE LEVEL	TERM
BLACK	0	BLACK	0	BLACK	1			BROWN	M	
BROWN	1	BROWN	1	BROWN	10			RED	P	
RED	2	RED	2	RED	100			ORANGE	R	
ORANGE	3	ORANGE	3	ORANGE	1,000			YELLOW	S	
YELLOW	4	YELLOW	4	YELLOW	10,000	SILVER	±10 (COMP TYPE ONLY)	WHITE		SOLDERABLE
GREEN	5	GREEN	5	GREEN	100,000	GOLD	±5			
BLUE	6	BLUE	6	BLUE	1,000,000	RED	±2 (NOT APPLICABLE TO ESTABLISHED RELIABILITY).			
PURPLE (VIOLET)	7	PURPLE (VIOLET)	7							
GRAY	8	GRAY	8	SILVER	0.01					
WHITE	9	WHITE	9	GOLD	0.1					

BAND A — THE FIRST SIGNIFICANT FIGURE OF THE RESISTANCE VALUE (BANDS A THRU D SHALL BE OF EQUAL WIDTH.)

BAND B — THE SECOND SIGNIFICANT FIGURE OF THE RESISTANCE VALUE

BAND C — THE MULTIPLIER (THE MULTIPLIER IS THE FACTOR BY WHICH THE TWO SIGNIFICANT FIGURES ARE MULTIPLIED TO YIELD THE NOMINAL RESISTANCE VALUE.)

BAND D — THE RESISTANCE TOLERANCE.

BAND E — WHEN USED ON COMPOSITION RESISTORS, BAND E INDICATES ESTABLISHED RELIABILITY FAILURE-RATE LEVEL. ON FILM RESISTORS, THIS BAND SHALL BE APPROXIMATELY 1½ TIMES THE WIDTH OF OTHER BANDS, AND INDICATES TYPE OF TERMINAL.

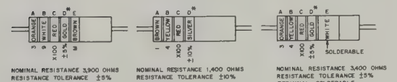
RESISTANCES IDENTIFIED BY NUMBERS AND LETTERS (THESE ARE NOT COLOR CODED.)

SOME RESISTORS ARE IDENTIFIED BY THREE OR FOUR DIGIT ALPHA NUMERIC DESIGNATORS. THE LETTER R IS USED IN PLACE OF A DECIMAL POINT WHEN FRACTIONAL VALUES OF AN OHM ARE EXPRESSED. FOR EXAMPLE:

2R7 = 2.7 OHMS 10R0 = 10.0 OHMS

FOR WIRE-WOUND-TYPE RESISTORS COLOR CODING IS NOT USED, IDENTIFICATION MARKING IS SPECIFIED IN EACH OF THE APPLICABLE SPECIFICATIONS.

EXAMPLES OF COLOR CODING



NOMINAL RESISTANCE 3,900 OHMS
RESISTANCE TOLERANCE ±5%
FAILURE RATE LEVEL M

NOMINAL RESISTANCE 1,400 OHMS
RESISTANCE TOLERANCE ±10%.

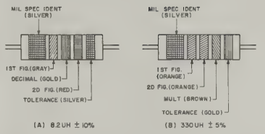
NOMINAL RESISTANCE 3,400 OHMS
RESISTANCE TOLERANCE ±5%
TERMINAL SOLDERABLE

COMPOSITION-TYPE RESISTORS

FILM-TYPE RESISTORS

* IF BAND D IS OMITTED, THE RESISTOR TOLERANCE IS ±20% AND THE RESISTOR IS NOT MIL-STD.

A. COLOR CODE MARKING FOR MILITARY STANDARD RESISTORS.



(A) 8.2 UH ± 10% (B) 330 UH ± 5%

COLOR CODING FOR TUBULAR ENCAPSULATED R.F CHOKES. AT A, AN EXAMPLE OF OF THE CODING FOR AN 8.2 UH CHOKE IS GIVEN. AT B, THE COLOR BANDS FOR A 330 UH INDUCTOR ARE ILLUSTRATED

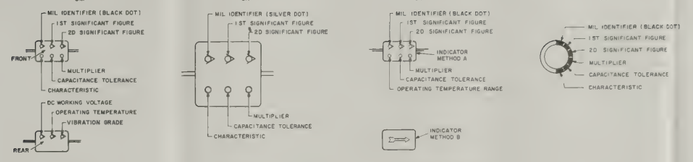
TABLE 2
COLOR CODING FOR TUBULAR ENCAPSULATED R.F. CHOKES.

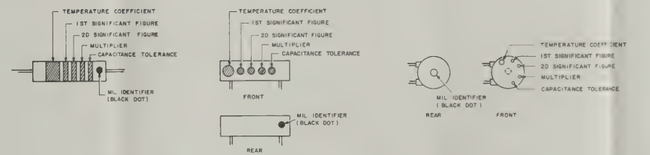
COLOR	SIGNIFICANT FIGURE	MULTIPLIER	INDUCTANCE TOLERANCE (PERCENT)
BLACK	0	1	
BROWN	1	10	1
RED	2	100	2
ORANGE	3	1,000	3
YELLOW	4		
GREEN	5		
BLUE	6		
VIOLET	7		
GRAY	8		
WHITE	9		
NONE			20
SILVER			10
GOLD	DECIMAL POINT		5

MULTIPLIER IS THE FACTOR BY WHICH THE TWO COLOR FIGURES ARE MULTIPLIED TO OBTAIN THE INDUCTANCE VALUE OF THE CHOKE COIL

B. COLOR CODE MARKING FOR MILITARY STANDARD INDUCTORS.

CAPACITORS, FIXED, VARIOUS-DIELECTRICS, STYLES CM, CN, CY, AND CB





C. COLOR CODE MARKING FOR MILITARY STANDARD CAPACITORS

Figure 6-1. Color code marking for MIL-STD resistors, capacitors, and inductors.

TABLE 3 — FOR USE WITH STYLES CM, CN, CY AND CB

COLOR	MIL ID	1ST SIG FIG	2D SIG FIG	MULTIPLIER	CAPACITANCE TOLERANCE			CHARACTERISTIC			DC WORKING VOLTAGE	OPERATING TEMP RANGE	VIBRATION GRADE
					CM	CN	CY	CB	CM	CN	CB	CM	CM
BLACK	CM ONLY DOT	0	0				±20%	±20%	A			-55°C to +70°C	10-58 H.Z
BROWN		1		0					B	E	B		
RED		2	2	00	±2%		±2%	±2%	C			-55°C to +85°C	
ORANGE		3	3	000		±30%			D		D	300	
YELLOW		4	4	0,000					E			-55°C to +125°C	10-2,000 HZ
GREEN		5	5		±5%				F			500	
BLUE		6	6									-55°C to +150°C	
PURPLE (VIOLET)		7	7										
GREY		8	8										
WHITE		9	9										
GOLD				0.1			±5%	±5%					
SILVER	CN				±10%	±10%	±10%	±10%					

TABLE 4 — TEMPERATURE COMPENSATING, STYLE CC

COLOR	TEMPERATURE COEFFICIENT[4]	1ST SIG FIG	2D SIG FIG	MULTIPLIER[1]	CAPACITANCE TOLERANCE		MIL ID[2]
					CAPACITANCES OVER 10 UUF	CAPACITANCES 10 UUF OR LESS	
BLACK	0	0	0			±2.0 UUF	CC
BROWN	-30			-1	±1%		
RED	-80	2	2	-100	±2%	±0.25 UUF	
ORANGE	-150	3	3	-1,000			
YELLOW	-220	4	4				
GREEN	-330	5	5		±.5%	±0.5 UUF	
BLUE	-470	6	6				
PURPLE (VIOLET)	-750	7	7				
GREY		8	8	0.01			
WHITE		9	9	0	±1.0%		
GOLD	+100					±1.0 UUF	
SILVER							

1. THE MULTIPLIER IS THE NUMBER BY WHICH THE TWO SIGNIFICANT (SIG) FIGURES ARE MULTIPLIED TO OBTAIN THE CAPACITANCE IN UUF.
2. LETTERS INDICATE THE CHARACTERISTICS DESIGNATED IN APPLICABLE SPECIFICATIONS MIL-C-5, MIL-C-250, MIL-C-11272B, AND MIL-C-10950C RESPECTIVELY.
3. LETTERS INDICATE THE TEMPERATURE RANGE AND VOLTAGE-TEMPERATURE LIMITS DESIGNATED IN MIL-C-11015D.
4. TEMPERATURE COEFFICIENT IN PARTS PER MILLION PER DEGREE CENTIGRADE.

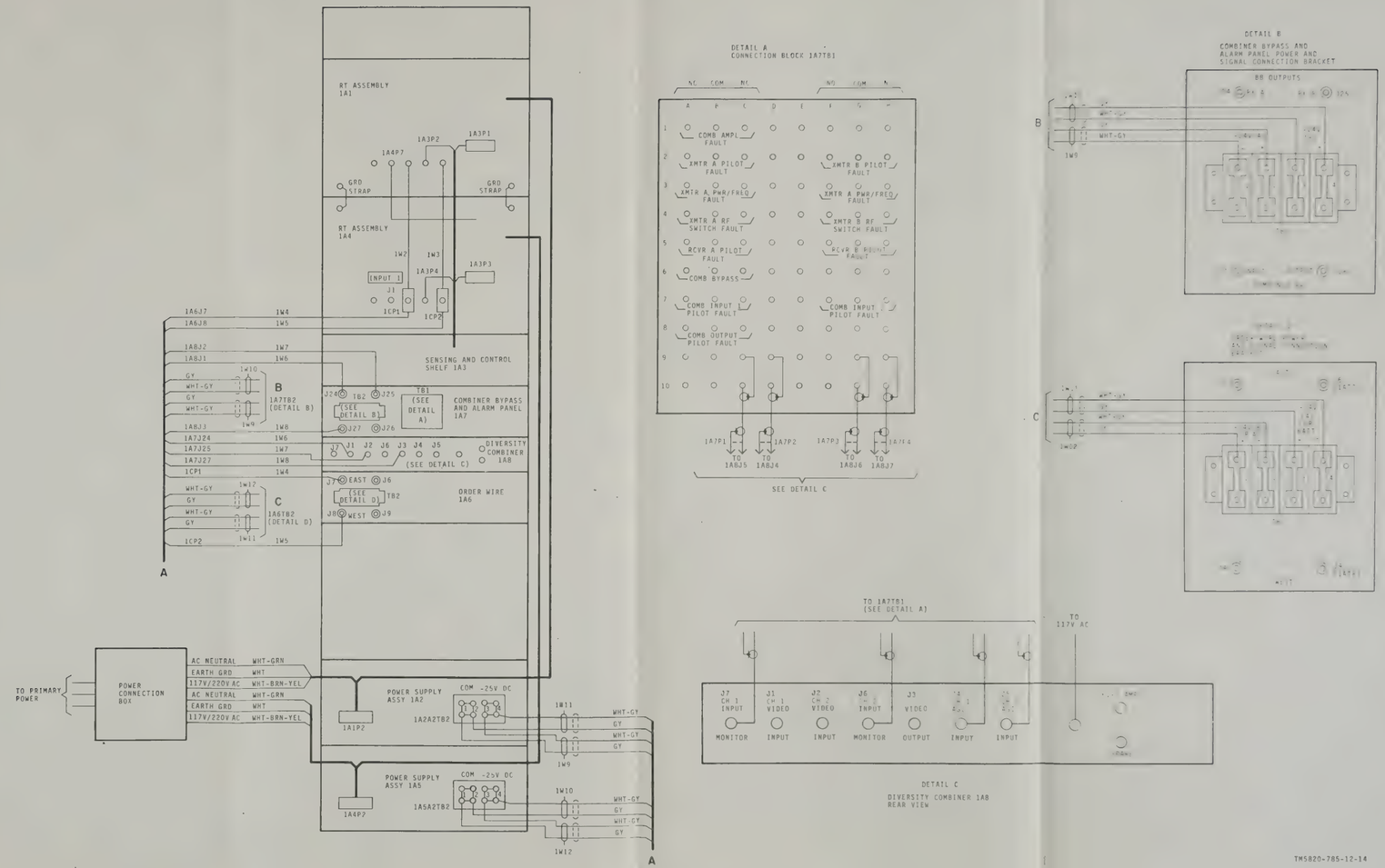


Figure 6-2. Equipment interconnection and cabling diagram.

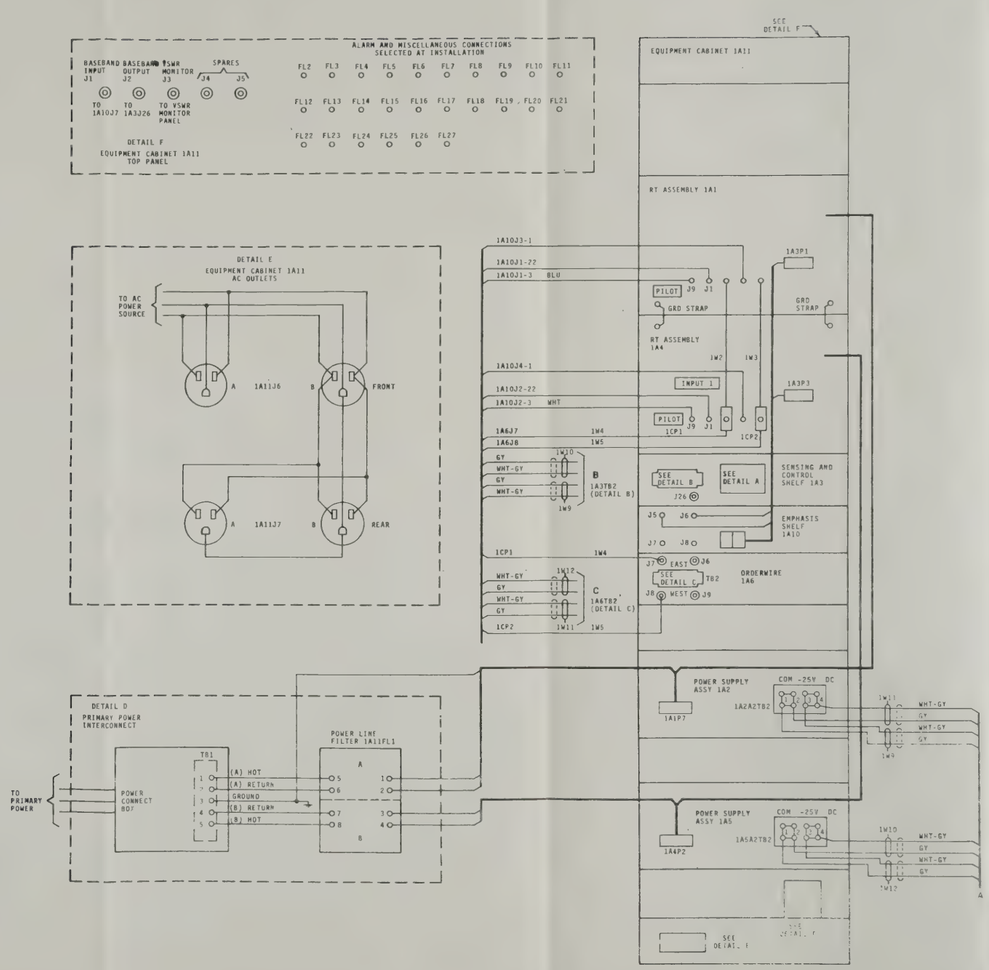
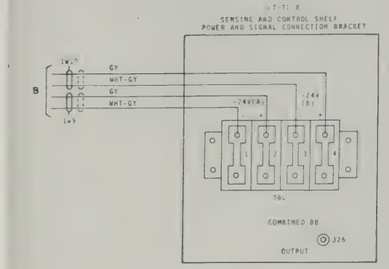
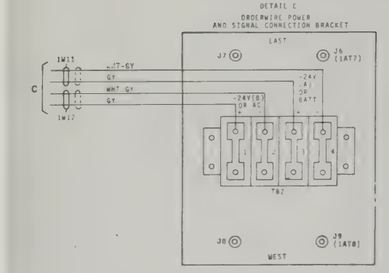
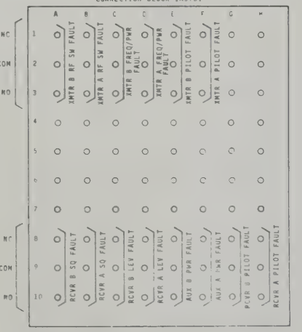


Figure 6-4. Equipment interconnection and cabling diagram (AN/FRC-80(V)3).







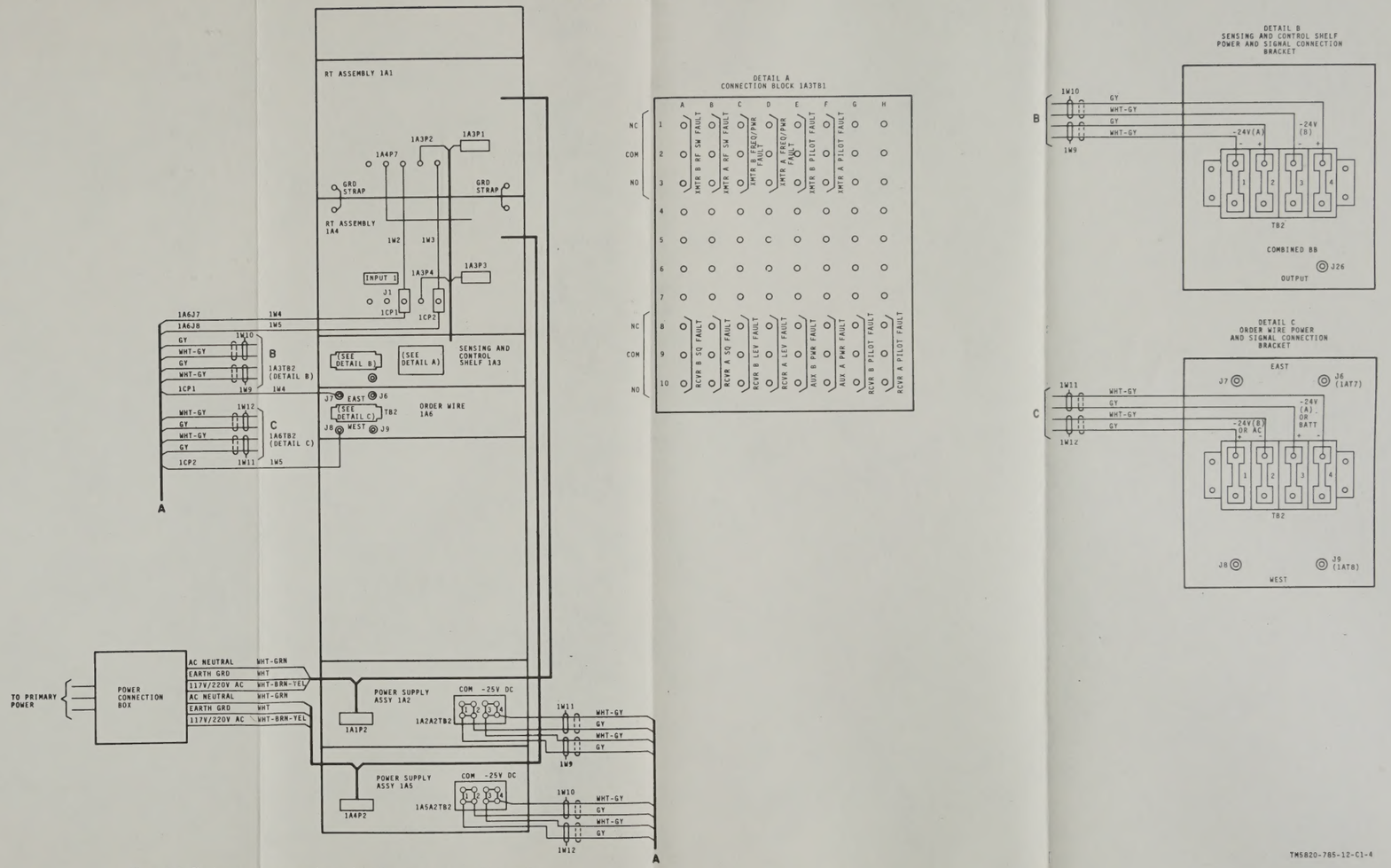


Figure 6-3. Equipment interconnection and cabling diagram (AN/FRC-80(V)2).

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